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ABSTRACT

This annual review of selected developments in agricultural education and training of the United Nations family presents economic and social progress reports of countries dependent upon agriculture. Topics covered are education and training in Africa, deep sea fishing training in Korea, correspondence courses in agriculture, national marketing centers, curricular needs for human nutrition studies in universities and colleges, and priority needs in agricultural research in African institutions. Additional references are appended. (GB)

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ANNUAL REVIEW OF SELECTED DEVELOPMENTS

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
ROME, 1967

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AGRICULTURAL EDUCATION AND TRAINING

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Food and Agriculture Organization of the United Nations, Rome, 1967.

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FOREWORD

It gives me great pleasure to introduce the first issue of the Annual Review of Selected Developments in Agricultural Education and Training which has been approved by the thirteenth session of the Conference. This review, the first of its kind to be published in the field of agricultural education within the United Nations family, comes at a most appropriate time. Never before has there been such widespread appreciation of the fundamental need for the development of human resources and of technical education and training in food and agriculture as essential factors in all economic and social progress in countries primarily dependent upon agriculture. Throughout the developing world, agricultural education and training is undergoing rapid expansion and adaptation to meet the challenge of unprecedented needs for trained manpower essential to the process of agricultural change and modernization. Without such change, accompanied by a rapid and sustained increase in agricultural production and productivity, there is little prospect of meeting adequately the needs of an expanding world population.

The unique importance of agricultural progress to the future prosperity and happiness of the peoples of most of the developing countries is widely recognized. What has not, so far, been accorded due importance is the vital part the rural community - farmers, farmers' wives, young people and leaders of every kind - must play in the whole process of rural transformation based upon agricultural development. It is understandable that, in the initial phases of agricultural development in countries based primarily on a subsistence economy, much attention in the surveys of land resources and in research into the problems of crop and animal production was devoted to their technical and economic aspects. It is now being increasingly realised that the human resources of development are of critical importance to future agricultural progress. Indeed, in many instances, the major technical aspects of increasing agricultural productivity are known and have been tested under local conditions: the real problem is how to get these improvements incorporated into farming systems and to provide the necessary incentives and services.

In the context of this new situation it will be appreciated that in the "development of human resources" agricultural education and training have an exceedingly important contribution to make. Not only do agricultural research and all the services in agriculture, forestry and fisheries depend upon trained professional manpower and skilled technicians of many kinds and at all levels but the whole agricultural community has to be educated and trained if it is to play its proper part in the transistion from subsistence to a modern farming economy. This poses a very great challenge both to the system of general education as well as to technical education and training in agriculture and related subjects.

FAO is responsible for a wide range of education and training activities in various parts of the world. Currently it has 68 projects of this kind employing nearly 600 experts and involving $70 million under the United Nation's Development Program. The projects are specialized - veterinary, fisheries, forestry, marketing, nutrition - as well as covering agricultural education in the general sense, both at university and intermediate levels. Some of the work going on is referred to in this issue of the Review which also contains some current thinking on the education and training problems as a whole. Subsequent issues will contain articles on other subject matter areas and references to projects in which FAO co-operates with other specialized agencies, notably UNESCO and ILO. In this way it is hoped to highlight some notable achievements, provoke discussion, and stimulate the emulation of particularly successful undertakings in many more countries of the world.

Viggo Andersen
Viggo Andersen
Director
Rural Institutions and Services Division

GENERAL AGRICULTURAL EDUCATION AND TRAINING IN FAO

By D.C. KIMMEL

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It would seem appropriate in this, the first issue of the FAO "Annual Review of Selected Developments in Agricultural Education and Training", to provide information on the scope, historical development and nature of the FAO program in this area.

The scope of FAO's work in education and training may be indicated in terms of subject matter, objective, and levels. From the standpoint of subject-matter, the expression "technical education and training in food and agriculture" is a comprehensive one covering general agricultural education and the specialized subject-matter areas in all of the broad fields in which FAO works - plant production and protection, animal production and health, land and water development (including agricultural engineering), forestry, fisheries, agricultural economics (including commodities, statistics, planning, policy, marketing), nutrition (including home economics), agricultural industries, and rural institutions (including agrarian reform, cooperatives, credit, agricultural extension, agricultural administration, and organization and methods of agricultural education and research). Normally within FAO, and in this paper, the expression "agricultural education" is used as an abbreviation for "education and training in food and agriculture" and includes all of the fields described above.

FAO's education and training activities have as their objective preparation of farmers, foresters, fishermen, technicians, research scientists, teachers in agricultural training institutions and agricultural administrators for the specific tasks to be performed in furthering agricultural development. The preparation is for direct employment as FAO does not render direct assistance in pre-technical or pre-vocational education and training, agricultural orientation in general education, nor in specific preparation for further education.

As regards levels of education and training, the range of concern is from the informal out-of-school level (including agricultural extension, farmers' and youth training) through intermediate levels, up to and including undergraduate and post-graduate education at the university level.

FAO's assistance in the field of education and training is of two broad types: (1) advice on determining requirements for personnel and in planning and establishing the organizational pattern and numbers and types of component institutions for the food and agricultural sector as a whole, and in establishing the general agricultural educational institutions within this pattern; and (2) advice on the development of staff, institutional facilities, and programs within each of the specialized food and agricultural subject-matter areas. The focus in this paper is on the first of these with particular reference to the needs of the developing countries.

FAO's Responsibilities in Agricultural Education

FAO's responsibilities in agricultural education are established in the Constitution and have been elaborated by successive sessions of the Conference.

These responsibilities have also been the subject of consultation with other agencies within the United Nations system. The basic reference is Article 1 of the Constitution which says: "The Organization shall promote and when appropriate shall recommend national and international action with respect to ...." (b) "the improvement of education and administration relating to nutrition, food and agriculture and the spread of public knowledge of nutritional and agricultural science and practice ...."

Most Sessions of the FAO Conference, beginning with the Sixth (1951), have confirmed and elaborated the Constitutional directive. The following selected excerpts from Conference Reports are illustrative of the action taken:

(1) The Sixth Session (1951) requested the Director-General "to give on request whatever assistance is possible to educational authorities in under-developed countries to improve methods, scope and content of vocational agricultural education".

(2) The Seventh Session (1953) asked for "more widespread education of rural people in basic agricultural knowledge .... more attention should also be given to the development of colleges of agriculture and of cooperation between colleges in member countries".

(3) The Eighth Session (1955) drew attention to "the importance of agricultural education .... not only for providing technically trained personnel ...... but also through vocational training, for raising the technical competence of farmers generally."

(4) The Tenth Session (1959) "welcomed the increased attention to be given to the improvement of secondary and practical agricultural schools. Work in lower and higher education in agriculture should be pursued concurrently, the latter to include work in the social sciences and in educational and extension methodology. The value of suitable FAO publications in promoting agricultural education was strongly stressed, and the organization by FAO of seminars and meetings was considered an important way of developing agricultural education."

(5) The Eleventh Session (1961) "recognized that the need for agricultural education and training in developing countries in all FAO's fields was a basic one which FAO should stress throughout its program. FAO's work in education and training should be closely coordinated with the work of UNESCO in the field of general education. The Conference also emphasized the need for short-term training of intermediate and lower level personnel and the development of training facilities in the countries themselves."

(6) The Twelfth Session (1963) after acknowledging the cooperation and expressing appreciation for the supporting work of UNESCO and ILO, expressed satisfaction with the emphasis given by the Director-General to education and training in all food and agricultural sectors and requested the Director-General to:

1. "accord high priority to FAO's assistance to Member Governments in conducting studies, preparing plans aiding the establishment of education and training institutions in all fields of food and agriculture commensurate with local resources and needs, including attention to the requirements of social and economic development planning for adequate technical and administrative machinery and reliable food and agricultural statistics.

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2. continue, within the United Nations system to exercise initiative and primary responsibility for education and training in food and agriculture,

3. continue to cooperate with other agencies and programs, and in respect of UNESCO and ILO, to intensify efforts for better cooperation and coordination in agricultural education and training, as specified in the agreement concluded between the three agencies in 1960-61."

(7) The Thirteenth Session (1965) "stressed that technical education and training in food and agriculture at the higher and intermediate levels, as well as agricultural extension and farmer training were matters for which FAO, within the UN system must continue to assume leadership and major responsibility."

While constitutional directive and subsequent Conference elaboration thereof establish FAO's basic responsibilities in education and training, the final definition of such responsibilities must also take into account the interests and contributions of other members of the United Nations family. In this context it may be noted that FAO is the agency within the United Nations system which has been created for the specific purpose of dealing with agricultural development as a whole. Experience in promoting agricultural development in newly developing countries suggests that little progress can be expected unless technical education and training in food and agriculture are treated as part of an integrated program including agricultural planning, agricultural administration, agricultural research, agricultural credit, supply of production requisites, marketing, etc. This integrated approach to agricultural development has become an FAO trade mark as exemplified particularly by the Mediterranean Development Project and by the World Indicative Plan for Agricultural Development now in preparation.

Even though strong links with other agricultural development services are of the utmost importance, agricultural education and training cannot be considered apart from education and training as a whole nor from overall manpower requirements. The FAO Conference has, therefore, emphasized the need for close cooperation with UNESCO and ILO, the two agencies within the UN system which share FAO's interest in this important field of work. In an effort to organize this cooperation on a fruitful basis, FAO has had and continues to have formal and informal contacts with these agencies. The most significant of these contacts were the FAO/UNESCO consultations of September/October 1960 which, through an exchange of letters between the Directors General of the two organizations in November of that year, became a formal agreement describing the manner of cooperation in the field of agricultural education. This Agreement which came about through FAO initiative is based on the premise that the two agencies have a joint interest and responsibility in the field of agricultural education but that within that joint interest and responsibility, each agency has a specific and complementary contribution to make. In general, the Agreement indicates that agricultural education as such is an area for FAO initiative and responsibility with UNESCO dealing with the non-agricultural or general educational aspects. To give recognition to the ILO interest in agricultural education and training, further consultations were held in February 1961. These consultations resulted in an ILO/FAO/UNESCO supplement to the FAO/UNESCO Agreement. This supplement indicates ILO's role in planning of agricultural education and training, exercised primarily through conduct of general manpower surveys and related activities.

It may be noted that while the Agreement and its Supplement provide reasonably clear guidelines for complementary activities, the programs of the three agencies, and particularly those in the field, have failed to reflect the desired complementarity. Important new consultations are now underway in an effort to find a formula which will enable each agency to maximize its contribution to a joint effort for strengthening agricultural education and training.

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Historical Development of FAO's Work in Agricultural Education

Work in agricultural education, as in other FAO fields, is financed from various sources including: Regular Program (assessed contributions of Member Governments of FAO); the United Nations Development Program (Special Fund and Technical Assistance components); Freedom from Hunger Campaign, cooperative arrangements with the International Bank; and Funds-in-Trust arrangements*. Expansion of FAO's work is so closely associated with these sources of finance that they represent convenient ways of tracing historical development of the program.

FAO's earliest work and the continuing technical backstopping for its field programs was and continues to be financed by its Regular Program budget. The earliest sessions of the FAO Conference stressed the importance of agricultural education and some work was done prior to 1951 in the Rural Welfare Division but the real beginning of a program in this field came in the same year through the establishment of the Agricultural Institutions and Services Branch within the Agricultural Division.

Within the Agricultural Institutions and Services Branch, in the earliest years, agricultural education was dealt with by officers charged with agricultural extension, administration, and research activities. During that period there was considerable activity in agricultural extension which, in FAO terminology, is an informal out-of-school agricultural educational service for farmers. Agricultural education as such, however, was included in the questionnaire on agricultural administration circulated to Member Governments in 1953. Through this questionnaire information was obtained on such matters as employment and training of key agricultural personnel.

The first FAO survey concerned exclusively with agricultural education was the Latin American survey of higher agricultural education, initiated in 1955 in cooperation with the Inter-American Institute of Agricultural Sciences. This survey served as a basis for discussion at the First Latin American meeting on Higher Agricultural Education, held in Santiago, Chile, in 1958, and was finally published in 1959. Meetings on Higher Agricultural Education in Latin America in which FAO participated were also held in 1962 and 1966.

The first FAO publication in agricultural education, however, was a mimeographed document entitled "International Directory of Institutions for Higher Education in Agriculture" prepared for FAO by the International Universities Bureau in 1957. The year 1957 was also important in that the first full time agricultural education specialist was appointed to FAO's Headquarters staff.

Three other activities which took place in this early period may be mentioned - an ad hoc meeting in 1955 of what later became the Sub-Committee on Extension, Vocational Training in Agriculture and Home Economics and Rural Youth of the European Committee on Agriculture; participation with UNESCO and ILO in the Vocational Education Training Centre for the Arabic speaking countries of the Near East; and assistance in 1958 to the Government of Switzerland in operating the first training course of the International Centre for Agricultural Education in Zurich.

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* Direct payment by Member Governments to FAO for the provision of experts and related services.

The year 1959 brought important organizational changes enhancing the status of agricultural education in FAO. The Agricultural Institutions and Services Branch was renamed the Agricultural Education and Administration Branch, and combined with the Rural Welfare Branch and staff concerned with Land Tenure and Settlement to form the new Rural Institutions and Services Division. Also associated with this re-organization was the appointment of full time agricultural extension/agricultural education advisers to the Regional offices in Bangkok, Cairo and Santiago.

In 1961, a study entitled "The Present Status of Agricultural Education Development in Asia and the Far East" was published. This was followed in 1963 by a study of the "Present Status of Agricultural Education in the Near East". Detailed national studies, among which may be mentioned those for Malaysia, Nigeria, Ethiopia, Ecuador and Chile, were prepared at a later date.

A significant expansion of FAO's program of agricultural education was made possible by the decisions of the Eleventh Session of the Conference in 1961 to: (1) establish a Special Program of Agricultural Education and Training in Africa with a two-year budget of $800,000; (2) create an Agricultural Education and Extension Branch; and (3) authorize appointment of a second full-time headquarters agricultural education specialist. In 1963 the Special Program organized Agricultural Education Conferences for groups of African countries in Kampala, Abidjan and Tripoli. These were followed in 1965 by the African-wide Conference on Intermediate Agricultural Education and Farmer Training held in Zaria, and the Conference on Higher Agricultural Education held in Khartoum.

By 1965 the Organization's work had expanded to the point at which the Thirteenth Session of the Conference considered it desirable to establish separate branches for Agricultural Education and Agricultural Extension. This arrangement remains in force at present.

It was also in this year that the Working Party on Coordination of Agricultural Training Programs in Europe first met to study the question of how these programs might be oriented to better serve the needs of the developing countries.

While the Organization's Regular Program and Budget for Agricultural Education were expanding as described above, two significant new developments took place: (1) the establishment of the Expanded Technical Assistance Program in 1949; and (2) the establishment of the United Nations Special Fund in 1959, both now merged into a single United Nations Development Program (UNDP).

Under the Expanded Technical Assistance Program, it became possible to send experts to live and work in the various countries, and also to increase the number of national and regional training centres and meetings. The earliest agricultural education and training experts were those assigned to work in UNESCO sponsored Fundamental Education Centres in Brazil, Ceylon, Liberia, Thailand, Iraq, Mexico (CREFAL), United Arab Republic (ASFEC), and Cambodia. Beginning about the same time, experts working on more formal types of agricultural education were assigned to Ecuador, Paraguay, Thailand and Morocco.

Under the Expanded Technical Assistance Program, several training centres and meetings on agricultural education were held. The first of these was the Training Centre on Vocational Teaching in Agriculture for the Near East countries held in Denmark in 1955. In 1963, the First Near East Seminar on Higher and Intermediate Agricultural Education was held in Beirut and a similar seminar for the Asia and Far East Region was held in October 1965. The latter seminar was followed in September/October 1966 by a Study Tour on Agricultural Education to the USSR for participants from the same Region.

A further important expansion in the Organization's work in agricultural education came with the establishment of the United Nations Special Fund in 1959. Financial assistance made available from this source has permitted the provision of teams of experts for extended periods of time, along with equipment, to assist governments in establishing or strengthening institutions for agricultural education and training. Most of the Special Fund financed agricultural education projects are still in operation and these are described in the following section dealing with the Organization's work at present.

In 1964 the Director-General of FAO and the President of the International Bank for Reconstruction and Development (IBRD)/International Development Association (IDA) established a cooperative agricultural program including agricultural education as one of its components. This program is making it possible for FAO studies and advice to be translated into action through loans granted to governments by IBRD/IDA. Under the Program, projects are being identified and prepared as the basis for granting loans to governments to strengthen or establish agricultural education institutions. Field missions for this purpose are carried out by an Agricultural Education Specialist attached to the Cooperative Program, specialists of the Agricultural Education Branch of FAO, and consultants. Since this program is relatively new the activities underway are described in the following section which deals with the nature and scope of FAO's work at present in the field of agricultural education.

The Freedom From Hunger Campaign (FFHC) initiated by the Director-General of FAO in 1960 is an effort to increase the flow of resources not only from governmental sources but, very importantly, also from non-governmental organizations and private agencies to assist in promoting across-the-board agricultural development with particular reference to food production. The resources made available from this source for improving agricultural education and training are usually small in magnitude but frequently of very great importance in filling gaps in the support of agricultural education financed from other sources. There are instances of individual grants of as much as $200,000 being provided to set up a training centre but the more usual grant is for several hundred or several thousand dollars to provide books or modest equipment for education and training institutions.

Another possible source of financing agricultural education projects is the Funds-in-Trust arrangement. Governments provide funds for FAO to recruit experts, grant and supervise fellowships or to procure equipment for improving agricultural education and training. To date this source of financing has been used to a very limited extent in the improvement of general agricultural education.

Scope and Nature of Work at Present

The present work in general agricultural education* embraces a wide variety of activities including surveys of agricultural education on national and regional bases, studies of manpower requirements, preparation of national plans for education and training in the agricultural sector as a whole, preparing and supervising implementation of projects for strengthening educational institutions, assistance in organising seminars and training centres in a variety of fields including teacher training, preparing teaching materials, granting fellowships, and conducting studies on relative effectiveness of various approaches to agricultural education. In the paragraphs which follow some indication is given of the nature and magnitude of these activities.

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*This section is confined to the Organization's work in general agricultural education which constitutes but one part of the total FAO program in education and training. For example, Special Fund projects in specialized fields of education and training - veterinary, forestry, fisheries, marketing, cooperatives, etc. - approved to date involve a Special Fund allocation of almost $49,000,000. Investments in education and training under the Technical Assistance component of the UN Development Program and under the Regular Program budget are correspondingly large.

Under the Regular Program, the Special Program of Agricultural Training in Africa is a major activity when measured in terms of financial resources involved. This is a continuing program initiated in 1962, with a budget of $400,000* a year, for such purposes as: assisting governments to prepare comprehensive national plans for agricultural education and training, covering all levels and areas of specialization involved in producing personnel required for preparation and implementation of agricultural development plans; advising on the improvement of existing programs and institutions; drawing up projects for acquiring financial and technical assistance to establish or strengthen institutions included in national plans; conducting short-term training centres to meet emergency needs for improving performance of personnel already on the job; granting of fellowships; and conducting studies on the effectiveness of approaches to agricultural education and training at various levels.

During the current biennium seven general agricultural education advisers, stationed in selected locations in Africa to serve groups of African countries, are moving ahead with the preparation of comprehensive national plans for education and training in the agricultural sector and rendering such general advice and assistance as may be requested by governments in their efforts to strengthen agricultural education. Fellowships, financed by the Special Program, have enabled trainers of agricultural teachers, extension workers and youth leaders to study in Europe.

A second major activity carried out under the Regular Program has been the study of agricultural education, extension and research in Latin America. This study was planned to cover all of Latin America on a country by country basis and was a joint effort of FAO, ECLA, OAS, IAIAS and IADB, banded together in the Inter-American Committee on Agricultural Development. Leadership of the Study was provided by an FAO Agricultural Education Specialist. UNESCO and the UNDP (Special Fund), although not members of the Committee, cooperated in the Ecuador study. In addition to Ecuador, studies have already been completed in Chile, Central America and Peru (the latter two under the responsibility of the Inter-American Institute of Agricultural Sciences). Some of the functions of the Inter-American Committee on Agricultural Development are now being taken over by the Inter-American Committee of the Alliance for Progress, and arrangements are being developed between FAO and other interested agencies, particularly the Inter-American Institute of Agricultural Sciences, to continue the studies in other Latin American countries. Added impetus to these studies and to the general strengthening of agricultural education and research in Latin America has been provided by the recent session of the Inter-American Economic and Social Council which has called upon the Organization of American States, with the cooperation of FAO, to intensify work in these two fields.

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* While the bulk of these funds are directed to general agricultural education activities, some are directed to payment of consultants and conduct of training centres in specialized fields of food and agriculture. The specialized fields are receiving particular emphasis during the current biennium.

Closely related to the education, research and extension studies is FAO's work in the establishment of national offices, in several Latin American countries, to provide for a continuing review of manpower requirements and development for the agricultural sector. This work is expected to form an important element in the proposed manpower project known as the Ottawa Plan now being initiated in Latin America by the International Labour Organization. A further contribution to the estimation of manpower requirements for the agricultural sector is the work being carried out in connection with the preparation of the Indicative World Plan for Agricultural Development.

Another Regular Program financed activity to which considerable importance is attached is the International Advisory Panel on Agricultural Education established in 1965. This Panel, composed of 13 members, drawn from both the developed and newly developing regions of the world has been established to provide guidance to the FAO Secretariat in the development of its programs in the field of agricultural education.

A part of the work in general agricultural education, which is the responsibility of the Agricultural Education Branch, is the provision of leadership in the development of Organization-wide policies and coordinated programs in the broad area of education and training in the food and agricultural sector. The mechanism for bringing together all interested divisions and units within FAO for these purposes is the Inter-Divisional Working Group on Agricultural Education, a group chaired by the Director of the Rural Institutions and Services Division.

In addition to the specific activities described above, the continuing work of the Regular Program headquarters and regional staff includes consultative and advisory missions to member governments, recruitment of experts for field programs and their supervision, preparation of publications and teaching materials, organization and conduct of meetings and cooperation in the activities of other agencies.

As was indicated in an earlier section, the Special Fund sector of the United Nations Development Program is a major source of financing for FAO field activities. The number and value of projects in the area of general agricultural education and training approved to date by the UNDP (SF) are indicated in the following table:-

TABLE 1. Approved UNDP (Special Fund) Projects in General Agricultural Education and Training Currently in Operation or Completed

Country	Project	US Dollar Value of UNDP Allocation
Algeria	Accelerated Training of Agricultural Technicians	1,381,700
Bolivia	Faculty of Agriculture, Cochabamba (COMPLETED 3/65)	375,000
Burundi	Agricultural Technical Institute, Kitega	1,146,100
Colombia	Agricultural Training and Research, Cauca Valley (COMPLETED 4/66)	931,700
Ecuador	Faculty of Agriculture and Veterinary Medicine, Quito	1,240,800
Ecuador	Faculty of Agriculture and Veterinary Medicine, Guayaquil	1,139,000
Guinea	National Agricultural School, Kindia	1,886,500
Liberia	College of Agriculture and Forestry, Monrovia	1,552,900
Mauritania	Agricultural Training and Extension Centre, Kaedi	943,500
Trinidad and Tobago	Agricultural and Forestry Training, Eastern Caribbean Farm and Forestry Institute	695,000
Tunisia	Training Staff for Agricultural Education and Production	1,601,400
UAR *	Mansoura Polytechnic Institute (Agricultural Section)	696,528
Upper Volta	Agricultural Training Centre, Bobo-Dioulasso	1,040,900
Uruguay	Faculty of Agriculture, University of the Republic	1,298,000
B. Regional Projects		
Latin America	Inter-American Institute of Agricultural Sciences	4,001,000
	TOTAL:	19,930,028

* Sub-contract from UNESCO

This list includes only those projects which are predominantly general agricultural education and training. Another very important project which includes education along with research and extension is the one providing $1,714,300 for further strengthening of these three areas of work in Chapingo, Mexico. In at least seven additional countries, requests for Special Fund assistance in strengthening agricultural education have been prepared with the aid of FAO and are now in an advanced stage of consideration by UNDP (Special Fund).

Of relatively less current importance as a source of support for the FAO field program is the Technical Assistance component of the UN Development Program. During the 1967/68 biennium, specialists in agricultural education are or will be working in Botswana, Brazil, British Honduras, Cameroun, Congo (Brazzaville), India, Malawi, Paraguay, Swaziland, Yemen (2), and in Western Samoa.

The FAO/IBRD Cooperative Program has participated in missions which are expected to result in the granting of loans for strengthening agricultural education in Bolivia, Chile, Ecuador, El Salvador, Ivory Coast, Nicaragua, Senegal and Sierra Leone. Activities under this Program are expected to expand in the near future to the point where it becomes a most important element in FAO's total support to the strengthening of agricultural education.

Examples of Freedom from Hunger Campaign (FFHC) support to general agricultural education are given in Table 2.

Table 2. FFHC Support to General Agricultural Education

Country	Project	US Dollar Value of UNDP allocation
Lesotho	Maseru Agricultural School. New buildings and equipment. Provision of one Lecturer in Agriculture.	250,000
Cameroun	Assistance to National College of Agriculture, Dschang.	750
	Equipping Library of Agricultural School, College of Arts, Science and Technology, Bambui.	2,800
Kenya	Books for Embu Agricultural Training Centre	1,300
Western Samoa	Text books, South Pacific Regional College of Tropical Agriculture, Alafua.	1,500
Ecuador	Assistance to Agricultural Vocational Training Schools	20,000

Conduct of Headquarters activities and support of all field programs is the responsibility of the Agricultural Education Branch which has a Rome-based staff of 11 members consisting of: the Chief, six Agricultural Education Specialists and a Teaching Materials Officer financed from Regular Program funds; two Agricultural Education Officers financed from UNDP (Special Fund) Agency overhead costs; and one Agricultural Education Officer assigned to the FAO/IBRD Cooperative Program. At the Regional and Sub-Regional levels, the Headquarters staff is supported by one Agricultural Education Officer in Latin America, seven in Africa, and the part-time service of Agricultural Education/Agricultural Extension officers in the Near East and Asia and the Far East offices, all financed from the Regular Program. The current number of field posts, not all of which are filled, is 32.

FAO. Philosophy and Guidelines for Advice on Agricultural Education

While a narration of responsibilities, the historical development of programs and of the current scope of activities is of interest, no exposition of FAO's role in agricultural education would be complete without some statement of the philosophy which dictates the nature and content of its agricultural education program. The keystone of this philosophy is that all agricultural education and training must be development oriented, that any programs and institutions established in member countries must merit a claim on the use of scarce resources by making a maximum contribution to development. Experience acquired in developing the Organization's program, as described earlier in this paper, has led to certain tentative broad conclusions which collectively constitute the general philosophy and serve as guidelines in advising member governments. It is fully appreciated that the situation in each country, and at varying stages of development, is different and that conclusions drawn and advice offered need to be modified accordingly. There is, however, a growing body of experience, gained in many different countries, indicating that certain approaches to the organization and development of education and training in the fields of food and agriculture are much more likely to lead to satisfactory, efficient and economical results, than others. Among the guidelines evolved as a result of the Organization's work in agricultural education and training are the following:

Planning the development of agricultural education and training

1. An urgent need exists in most developing countries for a carefully prepared overall plan for agricultural education and training, appropriately related to both the national agricultural development plan and the national system of education. Such a plan will provide for the establishment of a properly integrated structure, encompassing the numbers and types of institutions which will be most effective and economical in meeting the requirements for personnel at all levels and specializations in the food and agricultural sector. Comprehensive plans, based upon surveys of manpower requirements, the existing stock of trained personnel and the capacity and quality of existing training institutions, are essential if the urgent development needs of countries with limited resources are to be met. Only within such a framework can both national and external resources be utilized with maximum efficiency.

2. Before recommending the establishment of new institutions, involving capital and recurrent financial implications, it is considered wise to examine the possibility of reorienting or expanding existing institutions and services to meet newly defined needs. This approach is essential if the establishment of more institutions than a country can support, either in terms of total outlay or per student cost, is to be avoided.

3. Agricultural education and training programs and facilities, particularly in newly developing countries, need to be geared to the actual preparation of personnel for specific types of employment. Few countries can afford the widespread type of generalized agricultural education which turns out a student ready for employment only after subsequent job-oriented training in another institution.

4. To provide for the most effective use of limited resources, and to lay the foundations for effective cooperation between specialized interests involved in agricultural development, the number of separate specialized training facilities should be kept to a minimum. Many specialized courses can utilize certain basic facilities and staff in common. Further, if the veterinarian, the agriculturist, the forester and the home economist can all be trained in the same institution, there is a much greater chance of their cooperating well as a team in the field after their studies are completed.

5. Every attempt should be made to minimize the number of levels for which separate facilities are established. Two questions may be raised: (a) is it essential to have more than one level of technical education between mere training in skills and the university, or could there be one intermediate level institution, the level of which varied according to stages of development; and (b) can an institution established primarily to operate at one level offer instruction at other levels? In connection with this second point, the question arises of whether separate facilities for pre-service and in-service training are essential.

Agricultural education and the school system

6. There is an impressive volume of experience leading to the conclusion that the teaching of vocational agriculture in schools may be of questionable value in producing future farmers or agricultural technicians. There are several reasons. One reason is the difficulty of designing a program which simultaneously prepares for either farming, employment as a technician, or for admission to a higher level of education. A second reason is that the general education system is seldom well equipped in terms of philosophy, familiarity with the requirements of agricultural development, or access to field facilities to do the type of practical training required for preparation of farmers or technicians. Then, too, vocational traini in agriculture should not begin too early - possibly not before about 16 years of age. All of these considerations suggest that school education, at the primary and secondary levels, might better be concentrated on providing a sound general education including the sciences, oriented in such a way as to promote a real interest in agriculture and an appreciation of its fundamental importance in the life of the people and national progress and development. In this way the school system can make a positive and essential contribution by building sound foundations for subsequent vocational and technical training which can generally be done more effectively in different institutions under different management.

Farmer training

7. Perhaps the first and most significant thing to be said about farmer training is that it should be given to, and specifically adapted to the needs of, those who have both the possibility and incentive to farm. Farm schools, that is, schools within the educational system, established with the object of training prospective farmers, have for a variety of reasons seldom proved successful. In fact, such educational facilities have frequently been used by pupils as a means of getting further education to seek paid employment outside agriculture. A more likely and less expensive way of interesting young people in farming as a career and commencing to teach them practical skills has been through voluntary out-of-school informal

activities such as the 4-H Club movement and Young Farmers' Clubs. Vocational training is likely to be most effective when it forms an integral part of a broad agricultural development effort which makes available land under favourable tenure arrangements, technical advice, credit, production requisites, marketing arrangements, and reasonable living conditions - that is as part of a program which makes farming both possible and attractive.

8. In some countries, a fair measure of success has attended the relatively recent development of Farmer Training Centres, the primary purpose of which is to give residential short course training to practising farmers, their wives, and in some cases farmers' sons, in general agriculture and specialized topics. This type of training has the advantage that it is given to people already engaged in farming who are willing and able to put into practice on their own farms what is taught and demonstrated at these institutions. A whole range of other courses in such subjects as home economics, cooperative management and community development are taught at a number of these farm institutes which are also used for in-service training of field extension staff. Perhaps the greatest need to-day is for a study of the economics of this approach as compared to other means of bringing farmers up to date on improved agricultural practices.

Intermediate level training

9. In most of the developing countries, the training of technicians at the lower and middle levels of agricultural education is probably the most urgently needed, often the least well-developed, and yet the one which countries can best afford in terms of both training and employment costs. This type of training is most effectively and economically provided within the environment in which those who are trained will subsequently work. There is still, in many countries, a very great need for guidance in establishing realistic objectives and in developing this type of training on sound and practical lines. In particular, the facilities in such matters as a teaching farm, farm workshop, teaching equipment and aids, are often totally inadequate to the needs of this type of training.

10. It is also often not recognized that the whole aim and purpose of intermediate level training to produce agricultural technicians is fundamentally different from that of university level training for research and professional level agriculturists. The work of these two groups of trained persons, the middle level technician and the university graduate, is different but complementary. Too often the training of a middle level institution is weak in the proper teaching of practical skills and on the theoretical side is the pale shadow of a university degree course. There is thus much scope for the development of sound concepts of middle-level technical training and evolving the means by which this can effectively be done.

11. Both at the intermediate and university levels, there is a need to supplement training in the basic and applied sciences and technology with courses in economics and the social sciences. It is, of course, essential for trained persons to have technical knowledge but it is equally important that they understand the economic implications of the application of new technology and know how to transfer this knowledge and convince others to apply it.

12. There may be merit in siting pre-service and in-service intermediate level and farmer training at regional, area, or district centres where an applied experimental station, credit, farm supplies, market facilities and other agricultural development services are also sited. A part of the training may then be undertaken within operational programs, which later employ those trained. Training is thus specifically adapted to local requirements.

Higher agricultural education

13. There are very great advantages in placing a college or faculty of agriculture within the framework of a university. Such a faculty can draw upon the resources of other faculties and on common administrative and accommodation facilities, making possible reduced costs per student. As future leaders and decision makers in agriculture, students of agriculture must acquire an appreciation of the interrelationship of agricultural and non-agricultural disciplines in the promotion of agricultural development. Acquisition of this appreciation is facilitated when the faculty of agriculture is closely associated with other faculties. In research also, the faculty of agriculture can gain greatly from close association with other university research interests in the physical, biological and social sciences as well as in many applied fields of research (nutrition). It must also be remembered that placing agricultural studies at a university gives an important measure of prestige to agriculture as a worthy and important profession.

14. There is an obvious and pressing need in many countries to associate higher agricultural education and its research interests more closely with external research activities and with the work of the field extension services. The development of closer and more effective working relationships is not necessarily achieved, however, by placing the administration of these other activities under the university. There is considerable merit, especially for countries engaged in planned development, in concentrating in one place, administrative responsibility for all of the services directly involved: applied research, extension, training, credit, organization of farm supplies and marketing, etc. The faculty should train research scientists and senior extension personnel. It should also participate in planning the national agricultural research program and in conducting portions of the agreed programs. Administration of national programs of agricultural research and extension may, however, be so demanding as to detract unduly from the essential educational task, and would certainly create difficult problems of coordinating extension and applied research with other essential agricultural development services.

General

15. The stage has been reached when a considerably higher proportion of technical and financial assistance resources should be devoted to development of local institutions and programs as opposed to financing education and training abroad. This observation applies with particular force to most types of education and training below university level where the economics of training the relatively large numbers involved and the necessity for specific adaptation to ecological, sociological and linguistic characteristics of the environment in which those trained will work, generally prohibit training abroad. Undergraduate, and most forms of post graduate agricultural education can be better adapted to actual requirements if carried out locally, but the cost of this level of education may be prohibitive for the smaller countries. In such cases arrangements for use of facilities in neighbouring countries, where conditions are not too different, merit consideration. External assistance to national institutions in larger countries of a region willing to admit students from neighbouring countries, deserves particularly favourable consideration. There will, of course, always be a need for foreign study in the case of certain types of post graduate education, and short-term specialized training, requiring highly specialized facilities and staff, or where the numbers to be trained are too small to warrant establishment of local facilities.

16. The extraordinary expansion in the number and size of institutions of agricultural education in many of the developing countries has raised the urgent problem of suitable training for those going into teaching of agriculture as a career. At present virtually no specialized facilities for this exist in these countries. It may be that an integrated program of agricultural subject matter combined with educational principles and methodology may be the best way of meeting this urgent need. There is scope for experiment in this field which may, among other possibilities, involve university faculties of agriculture and education, in combined projects.

The above points are in no way intended as a comprehensive statement of the FAO approach to agricultural education and training. There are other significant issues to be treated and the arguments supporting the points made can be elaborated. In fact, each of the groups of points might serve as the subject for an article in a future issue of this review.

Concluding Observations

FAO is the agency within the UN system established to deal with all aspects of agricultural development. Education and training are an integral and increasingly important part of the Organization's total program. Work in this broad field falls into two main categories: (1) general agricultural education and training, and (2) education and training in specialized areas such as forestry, fisheries, veterinary medicine, marketing, cooperatives, etc. The subject of this article is primarily the first of these categories which currently involves a staff of 11 Headquarters, 7 full and 2 part time Regional, and about 32 field officers. Special Fund projects currently under operation involve a Special Fund allocation of more than $18,000,000. Additional work is financed by UNDP (Technical Assistance), FAO/IBRD Cooperative Program, Regular Program, Freedom from Hunger Campaign and funds provided directly by governments for specific activities. The work is characterized by a strong development orientation intended to assist governments in developing national plans and component institutions for education and training which will be most effective and economical in preparing personnel for the specific kinds and numbers of jobs to be filled in preparation and implementation of agricultural development plans.

TOWARDS RURAL UNIVERSITIES IN AFRICA

by

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Formal agricultural education in Africa is of recent origin. It dates back for only two or three generations. Yet agriculture as a practice and a means of living has been with us for thousands of years. Prompted by the sheer necessity of providing subsistence for man and his family, and the struggle against the hazards of nature, traditional father-to-son training has proceeded throughout the ages.

In Africa, man has sought sustenance from the land in the form of animals and crops, and in so doing has developed agricultural practices by trial and error which are in harmony with the environment. Thus, even today, nomadism and shifting cultivation are practised. These traditions are not only adopted by successive generations, but are tested and re-adapted through evolution and 'community selection' as a result of changing needs or changing social and physical environments. Now, as before, there is an underlying core of traditional training in existence. So, although in Africa this form of education has been practised for centuries, we have only very recently become aware of the need to do more than this.

It is safe to say that the scientific approach to agriculture in Africa would probably have received less attention had it not been for the European influence. Growing awareness of the need to copy western models increased when Africans lived under the umbrella of the West. Further, the creation of schools, colleges and universities in Africa has brought into clearer focus the possibility of better material standards of living. In Africa, the only way to achieve this is to improve agricultural production through a proper understanding of the environment and the adoption of measures which will successfully harness and control it.

An 'élite' has been created in Africa through education, both in agriculture and general culture. The resulting social cleavage has had two effects, one good and one bad. The good result is that the 'élite' class has taken over the leadership of our respective nations from colonial rule after independence. The bad one is that this class was not mentally prepared to accept the arduous responsibility of improving conditions of living by developing agricultural production. Why were the comparatively few trained Africans not prepared to meet the challenge of leadership in rural development, in the same way as they were happy to take over the responsibility of political and administrative tasks? The answer is obvious: it is more glamorous (and comfortable) to administer and rule through centralized urban organizations than to extend knowledge under hard rural conditions. So the farmer and the development of his land - although the backbone of the African economy - received little attention, and even less imaginative appreciation by policy and decision makers. The few trained Africans had their eyes set on urban life and the 'prestige' it seems to offer.

In the Sudan, as in all the other African countries I have visited, one hears two very familiar themes: (1) the national income depends almost entirely on agriculture and yet (2) students do not wish to take agriculture as a career. They prefer the white-collar jobs like those associated with the Law. This may be due to an urban-loving propensity coupled with a fear of the 'dirt' and hardship of rural life. Further, there is more money and security to be obtained in the practice of the one than the other. Of course, migration to towns and cities is universal. It is not restricted to the 'élite' educated class in Africa or elsewhere.

Yet the picture in Africa is somewhat distorted. In more developed countries, migration to urban industrial centres is created by the demand for labour and is also stimulated by mechanization of agriculture. In Africa, however, increased migration to towns (as a result of education) has highlighted under-employment in rural communities and intensified unemployment in the urban centres. This is one aspect. The other is that higher level education resulted in an urban-loving 'élite' pressing for employment in the towns for the sake of material comfort and the craving for 'power posts'.

The 'Graft of Western Agricultural Education Systems on to African Society

In France, Italy, Germany and Britain, where the first (western-type) universities arose, academic disciplines such as Agriculture or Engineering were not acknowledged. Originally all the universities of Europe taught theology and the humanities. They sprang up in semi-rural areas but quickly assumed the role of educating the 'élite', and the aristocracy. The 'technologies' were then beneath the dignity of the academics: these subjects were subsequently assigned, as in Germany and other European countries, to institutes away from the universities, evidently because they did not wish to entertain in their midst such mundane topics.*

After the Industrial Revolution, and with the rapid development of industrial urban capital, the professions of physical and chemical technologies became lucrative. So, while better brains were gradually attracted to engineering, agriculture as a technology sank into even deeper oblivion. The importance of the application of science to agriculture as a discipline in the university was realized in Europe only after the first World War, and the study of agriculture as a university discipline was effectively and persistently encouraged only as a result of the Second World War. Hunger in wartime and now the prospect of hunger resulting from the 'explosion' of the world population has substantially stimulated the development of agriculture both as an industry and as a discipline.

The western concept of a University was recently exported to the 'under-developed' countries in Africa, Asia and South America that fell under the domain of Europe. This western concept was accepted more or less unchallenged. Much earlier, universities were created in North America. The settlers in North America, however, managed to mould the idea of a University to suit the needs of their new environment. The western form of university was a 'graft', taken straight from an European urban setting and placed into an African environment. It was sure to suffer from severe wilt if not death. The first 'graft' came from Durham University on to Fourah Bay in Sierra Leone, which brought an affiliation between the University and Fourah Bay College of theology and humanities. That was some 90 years ago. Fourah Bay University College, the oldest in Africa, still has no faculty of Agriculture. Needless to add, Sierra Leonians are predominantly agriculturists.

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* In Cambridge when the Chair for Agriculture was established in 1899, the current academic's reaction then was "however harmless, it may be to try an experiment in this direction, the question whether these 'bread studies' are really things a University should touch is a very open one".

Four Fundamental Points

I wish to draw attention to four fundamental points:-

(1) If Sir Eric Ashby (from whose writings the term 'graft' is borrowed) has some guarded reflections on the total success of the experiment in higher education in Africa, then I submit that its weakness is decidedly more evident in respect of Agriculture. The urban university faculty of agriculture, be it in Shambat, Legon, Kinshasa, Ibadan or Makerere has done little to influence rural society and provide it with the appropriate leadership. There are numerous justifications put forward for this - social, staffing, language, finance or experience - but there is an underlying and inherent limiting factor. The faculty, by dint of its statutory links with the urban university, tended to be influenced by the "city" faculties, and hence to be involved in two largely contradictory functions. One was to be in harmony with the "city" faculties: the other to initiate and direct thought toward rural development. Nevertheless, if faculties of Agriculture had originally been planted in a rural setting too far removed from the intellectual influence of the urban university they would probably have failed even to germinate.

(2) In the belief that Agriculture is not a "status" occupation the graduate in Agriculture has tended to become a government agent vested with authority to give it gloss and glamour. My views on this matter may be challenged, but it is true that agricultural field officers (the title itself suggests command) have inspected the field and the farmer rather than advising and imparting knowledge to him. Many still believe that their main task is to direct the farmer, and, if possible, rural society, by a benevolent set of regulations and orders based on the authority of science as applied to agriculture. The officer frequently has the title of Inspector of Agriculture. Thus, faculties of agriculture in Africa came to accept with little challenge the authoritarian outlook of its graduates when they became government officials. Indeed without that romance of authority many students would not have chosen Agriculture as a career.

(3) In English-speaking Africa, where faculties superseded diploma-awarding schools of Agriculture, or when new university faculties of agriculture were launched, a rigid emphasis was placed by the planners upon 'academic standards'. But the meaning and content of this term is relative, flexible and vague. For example, a good deal of discussion still occurs about the comparative academic standards of British, French, American and Russian degrees and diplomas. To leave aside a complex (and sensitive) topic in order to look at it from an African point of view, I venture to state that in a commendable attempt to achieve and maintain an academic 'international gold standard', much imaginative thought has been compromised.

Khartoum University developed almost exclusively on the basis of similar courses aimed at similar academic standards. In part this meant that the examiners from London University were satisfied with the courses taught and were convinced that the student in Khartoum attained academic status in examination comparable to London. This is a generalization, but it is essentially true. Whereas a London examiner in Chemistry, Bacteriology or even Economics is admirably suited to assess a syllabus or a script, the position in Agriculture is by comparison more complex. Looking back (and being wise after the event!) a different and more imaginative agricultural course could have been projected without compromising 'academic standards'. The forces of historical association and the 'home' patterns of agricultural education played decisive roles.

The resulting courses leading to the first degree came to reveal striking similarities to that of London, not only in content and structure alone but also in objective. In Shambat, as in London, we found ourselves aiming at the general degree in Agriculture. And herein lies the major weakness of the 'graft'. The underlying objectives of the London general agricultural degree - most fashionable just after the last war - aimed at producing scientifically enlightened farm managers and advisory officers. The course, therefore, was tailored to fit these objectives. In all sincerity, London's paternal sentiment was that our graduates would do the same. If that was possible, it would have been an ideal plan. London even insisted that we have our own 'model' University Farm, primarily to show students scientific farming. But all our graduates became absorbed as employees in the Ministry of Agriculture. The course that is made to produce an enlightened farmer and manager in a developed country, however, does not necessarily fit and equip the agricultural adviser and the planner in Government service for a developing country. In the former, one deals with the physical, biological and economic environment of the farm. In the developing country, on the other hand, one deals in the first place with an emerging social environment and [illegible], establishment of influence through dedicated leadership.

Nevertheless, the general degree system of London University paid dividends, but in a different way from that originally foreseen. The more academically inclined graduates were lured away from the gloss of authority and into the domain of further studies. They were sent abroad for higher degrees and many of them have come back to staff the Research Stations and to become reabsorbed as lecturers in the Faculty. None of our graduates became a farmer and only one or two became farm managers. Those who did not take up research or teaching became competent in their respective executive careers by hard experience and self-education.

(4) In almost all forms of society, formal education originates as a masculine property. Womens' education comes in the wake of their social emergence. When the idea of the University was exported to Africa during the last thirty years it still had an exclusive bias towards serving masculine education. Needless to add, it found the African society dominated by men, especially in its Islamic sectors. Comparatively little awareness was shown by these newly-introduced institutions of the need for training in better home and rural community development, and for better infant and child care. Girls, like boys, became lured by the urban university and jobs in the city. The drain of brain power and human creativity acted on both sexes and away from rural development. This resulted in two trends (a) the rural areas remained comparatively stagnant and (b) migration to urban districts involved considerable numbers of men and women of quality.

In this brief account of the interaction between the western type of university faculty of agriculture and society, I have drawn my generalization almost entirely from experience pertaining to British-modelled Universities. The British, more readily than the French, allowed their higher educational systems to travel overseas and influence societies in their own grounds. Up to the present the two recently created Universities in Senegal and Ivory Coast on the French design have no faculties of Agriculture. The French and other western-style University systems have had little time on African soil to make possible a realistic assessment of their effect on society.

I have purposely stressed the weaknesses of the 'graft' in this appraisal. Its merits are clear and tangible; the viability, effectiveness, resilience and respect this new experiment has achieved in Africa is in itself enough evidence of its success. In stressing what seem to me to be weaknesses of fundamental nature, I am also seeking to promote further thinking about controversial ideas which are very topical.

Towards Rural Universities

It is evident from what has been said above, that I advocate a bold attempt at establishing new Universities with a clear orientation towards agriculture and rural community development. I expect that in the next five to ten years Africa will see the birth of more universities and institutions of higher learning. It is wise now to reflect on the need, nature, size and function of the future trends in higher agricultural education in Africa. This is a vast topic but I shall refer to only two important aspects of it, viz. the size and the structure of future rural universities in Africa.

Size

The question of optimum size for a university and the ratio of student numbers to national population has been widely discussed in recent years. This ratio is estimated to be 0.6 per cent in France, 1.4 per cent in the U.S.S.R. and 1.8 per cent in the U.S.A. In the Sudan the ratio is 0.02 per cent and, excepting the United Arab Republic (where the ratio is higher than in Europe), the other African countries are comparable to the Sudan.

The 10-Year Development Plan of the Republic of the Sudan (1962/1972) gives as a conservative estimate a need for about 1,000 agricultural graduates. It is unlikely that we will achieve more than half this target. On the other hand, pressure from secondary schools is rapidly mounting. Thus, it is estimated that even with the present 'gold standard' intake regulations, the University of Khartoum can accept only half the eligible applicants from schools by 1967. In 1965 it accepted approximately 850 students, almost all those eligible by our standards of entry. Thus, the Sudan can justifiably support a new University in two years time, or alternatively the University of Khartoum should double its intake. But taking more students (than 850) means even more Arts and Economics graduates, and hence a greater increase in the 'élite' unemployment. This problem is already with us in the Sudan.

Today planning of university size (at least in the Sudan) is taking into account this unemployment problem. Some systematic selection of intake may have to be developed to off-set this 'inflationary' tendency. With their inherent limitations (imposed by an urban philosophy and setting) our faculties of agriculture are unable to cope with this bulge however much they attempt a stretching operation. A faculty planned and built to cater for a 10 to 20 student intake can expand to an intake of 50 but not one of 500. To envisage an intake of 500 one must think along the lines of starting a university, not simply expanding a faculty.

Universities may be as large as 100,000 students - as are those of California and Paris - or as small as a few thousand or several hundred students, as in almost all Africa. The Robbins Committee Report on Higher Education in the U.K. suggests 8,000 - 10,000 students, including post-graduates, as an optimum size. This may well be a suitable size for Europe and industrially developed countries. But any attempt to increase the present University of Khartoum to 10,000 students from its present 2,500 will give rise to two limitations; first, the bulk of the increase will go to Arts and Economics, and a disproportionately small number to Agriculture, and secondly, the problem of 'élite' giving rise to under-employment as well as unemployment will be proportionately aggravated. For an urban university in Africa, I venture to suggest that the optimum number should be 2,000 - 3,000 students.

If this is accepted, and taking into account the pressure from secondary schools, then the Sudan can start now to launch a new rural university and yet still fail to meet educational needs. If urban universities today are to be levelled off at 2,000 - 3,000 a rural university should have a much higher figure of 8,000 - 10,000, because the output of these new universities is in great demand today and should increase for generations to come. This statement is naturally based on the assumption that the university will be motivated by deep conviction and pride in the agricultural profession, which it effectively imparts to its students and radiates by extra-mural activities into its rural environment.

Structure

The Land Grant Universities of the U.S.A. have often been cited as a suitable model for universities in developing countries. This may well be true but it may not. Their basic historical concepts and ideals have a great deal to offer. The Land Grant College Act of a hundred years ago was designed to stimulate the growth of a developing rural community in new virgin lands. Likewise, Africa now is largely a developing rural community in very similar circumstances. But Land Grant Colleges evolved into 'modern' State Universities serving the needs of a rich and a largely urbanized community. To try to adapt the present State Universities to fit our needs would be unwise and unrealistic. Obviously, the most realistic way to design new rural universities in Africa is by critically examining our own existing systems and modifying them in such a way as to vitalize rural life and its economy.

The new university must have at its core a strong School of Agriculture. Other important 'servicing' schools are, Science, Education, Home and Community Development and (for lack of a better name) a School of Humanities. The degrees awarded must all bear the same title, to avoid eventual fractionation of the Schools and the tendency for them to become separate academic entities, like existing faculties today.

All students must take the basic courses in Science and Agriculture and select a minimum number of supporting courses from the other Schools. There must be a definite trend towards specialization, but on a broad basis, tapering to a final year in which courses (and a dissertation) culminate to produce a graduate with a measure of competence in one field of specialization but not exclusively so. The course could be of five years duration and the students should be drawn direct from fourth grade secondary.

Could such an institution be justifiably considered by critics as a glorified Institute of Agriculture or a Polytechnic School of Agriculture? Perhaps two additional and essential features in the proposal would invalidate such criticism.

(1) The rural university must be closely associated with the experimental station, both physically and functionally.

(2) Its School of Education should have the mandate of the Government to administer the extension service of the rural community in its area.

These last two functions, together with formal teaching and research programs, reflect strongly the desirable influence of the Land Grant University concept.

Development and future role of Urban University Faculties of Agriculture

Many institutions, like biological units, were born, they prospered, produced, served their function and died. They were superseded by new and more adaptable units of learning. The physical structure of such institutions may still remain, but the functions they originally served usually became obsolete or outmoded. Is the fate of the present urban faculties of Agriculture in Africa pointing towards atrophy and natural death? The answer is not simple, because the development of the whole socio-economic system in each environment determines whether such institutions live and grow, or whether they stagnate and perish.

Assuming that social and economic development justifies the continuance of existing Faculties, how can they best serve society side-by-side with the new rural universities in which agriculture is central and supreme? In advocating the development of rural universities are we creating mutual antagonisms between the old urban 'élite' and the new rural intelligentsia? This would be a tiresome and wasteful exercise which need not occur. In fact they have a joint part to play in the promotion of national development.

In this connection, may I make some observations based on my experience as a teacher and administrator.

The Faculty of Agriculture, Shambat, one of the oldest in Africa, has passed through its adolescent troubles successfully. The predominantly Sudanese staff are as well qualified and dedicated as one can hope to find anywhere in the world. Its physical facilities are adequate for purposes of teaching and research. Until the Sudan takes the bold step of launching rural universities, this faculty will have to shoulder the tremendous and exacting task of providing leadership in the vast field of agricultural production and rural development. This task is not peculiar to Shambat. Makerere, Kumasi, Legon, Alamaya have similar responsibilities. Ours, however, are quantitatively different because we are the only faculty of Agriculture in the largest country in Africa.

What has been achieved by this Faculty so far has been summarized in a recent article in the U.K. journal 'Nature'*. But a great deal more needs to be done, arising from the following considerations.

(1) Students have been partly neglected, because they are often taken for granted. We need to teach them with more zeal, and with a conscious effort to increase their awareness of rural needs for development.

(2) The staff must be encouraged to produce more textbooks and publications so that, amongst other benefits, the student feels that the courses are not also an imported 'graft'.

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* Nour, M.A. - Nature, London, 13 November 1965.

(3) Extra-mural activities should be brought more to the foreground in an integrated plan involving staff and students, enabling the surrounding rural community to become associated with, and vitalized by, such an association. Such an activity has obvious benefits for the Faculty as well.

(4) The subject chosen by the final year student for his dissertation must have direct application to the solution of a local problem, and

(5) Research by staff and post-graduate students must also be on a realistic basis, so that the results obtained can be of direct bearing on existing problems. However, the research need not lose sight of the far-reaching implications of rural problems.

And here is my final submission. The urban faculties of agriculture should develop along lines that gradually lead away from serving local rural communities and more towards specialized national or even regional requirements. The Faculty in Khartoum is seriously developing schemes of research geared to investigating arid and dry lands. This was not possible in the past because of such 'teething troubles' as the quick turnover of staff. Shambat is in an excellent position to carry out Arid Zone research and its results could, with modifications, be applicable to the whole savannah belt of Africa. Similarly, regional or national long-term research programs on the wet tropics could be developed by Makerere, Ibadan, Kumasi or Louvanium.

With the growth of such specialized schools of research, courses of an advanced and correspondingly specialized nature will develop for the benefit of the nation, the region and even the whole world. Khartoum now is thinking of initiating a one year post-graduate diploma course in Tropical Crop Protection with emphasis on the dry tropics.

Finally, urban faculties can play a vital part in research of a more national nature such as marketing of major (cash) crops, agricultural biochemistry as applied to food technology and the assay and persistence of insecticides and fungicides, to mention a few examples of the many topics that existing research stations have no time to tackle. These, because they are 'academic', could well be (for the immediate future) the responsibility of the urban faculties.

Given good planning and good-will, both the rural university and the urban faculty can readily offer leadership in all aspects of progress and self-development among the rural community.

SPECIAL PROGRAM FOR EDUCATION AND TRAINING IN AFRICA

By FERGUS B. WILSON

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During the past decade the role and importance of agricultural education in Africa has undergone profound and unprecedented change. It used to be considered a relatively minor activity principally concerned with the training of junior field staff. Now, technical education and training in food and agriculture are universally recognized as key factors in the whole process of economic and social development in African countries. Agricultural education at all levels from university faculties through intermediate levels to farmer training has developed rapidly during the past 10 years.

A single example will suffice to illustrate this point. In 1955 in the three East African countries of Kenya, Tanzania and Uganda there were 10 institutions devoted to agricultural education with a total full-time teaching staff of 30. By 1965 there were some 60 training institutions for agricultural, veterinary and forestry training with full-time teaching staff of more than 300. There have been spectacular developments in farmer training, and in some countries the training of women in home economics and agriculture is rapidly expanding.

These changes are a direct reflection of a new attitude on the part of governments to the fundamental importance of developing the agricultural and human resources of their rural areas as the most important single factor in social and economic progress and prosperity. The majority of African countries are basically dependent upon agriculture. A very high proportion of the total population live in rural areas and depend for their livelihood upon agriculture and related rural occupations.

Whilst in a number of African countries there are valuable plantation industries and a number of other productive cash earning enterprises in crop and animal production, the basic pattern of most countries is still that of peasant subsistence land use. In many cases, various types of cash earning crops or livestock have been superimposed upon traditional agriculture but generally there has been little or no change in the nature of land tenure or the systems of agriculture. It is difficult anywhere to deny the fact that peasant subsistence agriculture is not prosperous. It is not surprising, in these circumstances, that the school system is commonly looked upon in rural areas as the main channel of escape from the life of toil and poor returns of peasant agriculture. Since in towns and industries there are not enough suitable jobs available to meet the needs and aspirations of the many young people coming from the rural areas, urban unemployment problems are now common features in those countries. Many believe that only by the rapid development of an economically viable system of agricultural production can these urgent problems be solved.

Since agriculture is so fundamentally important to the future of most African countries, there is a need to create and foster the development of a new image of a modern, progressive, and prosperous farming industry, which can command public respect and offer an economically sound way of life to farmers and their families. This implies the intelligent application of the results of scientific research and technical advances to the improvement of peasant agriculture and other forms of agricultural enterprise; even more important still, it involves gaining the confidence and co-operation of millions of small-scale cultivators and pastoralists in national plans for agricultural development. Frequently in the past attention has been focused exclusively upon the technical aspects of crop and livestock improvement while little or no attention has been paid to the economic and social factors, so vital in such processes of change. Thus education within the school system and technical education and training thereafter have enormously important roles to play in the creation of new attitudes and the acquisition of new knowledge and technical skills, without which advance in agriculture is not possible. It was this situation and the growing awareness of the urgent need to do everything possible to support and strengthen the development of agricultural education and training which led to the resolution of the Eleventh FAO Conference in November 1961 to establish the Special Program for Education and Training in Africa. Its primary purpose was to assist African countries in planning, strengthening and expanding the complex of permanent institutions needed for the effective training of personnel at all levels and in all the specialized fields of food and agriculture. A second objective was to assist, in every way possible, with technical training schemes designed to meet the immediate needs of countries involved in new and major programs of development. The rapidly changing situation in many African countries, and the urgent need for trained personnel to implement the wide variety of development projects, has added further emphasis to the need for support in the development of a sound structure for agricultural education and training, within the framework of national agricultural development plans and in appropriate relation to education as a whole.

Work of the first biennium was principally concerned with getting the Program established. A headquarters unit in Rome of two professional officers was set up and six regional Agricultural Education Advisers were appointed and posted to selected duty stations in the English, French and Arabic speaking regions of Africa in which they could advise and assist groups of countries. Much of the time of staff members during their early service in the field was taken up in making contact with the ministries, institutions and persons concerned with agricultural education and training and with making preliminary assessment of the problems. In the more specialized branches of technical education such as forestry, fisheries, home economics, horticulture and animal health, their reports were passed on to the appropriate technical Divisions of FAO.

The Special Program was continued in the 1964/65 biennium. Emphasis was placed upon the need for a proper assessment of future requirements for trained manpower in the agricultural sector of the economy, and for the planning and development of an institutional structure capable of meeting these requirements in an effective and economical manner. This task is not easy because planning of this nature involves a specific request from the government concerned and a considerable amount of detailed work and references to a number of different departments. The estimation of requirements for skilled manpower is also a relatively new process in which governments are themselves experimenting. Manpower needs in agriculture can only be properly studied within the context of overall national development plans, the anticipated output of the school system at different levels, and the availability of employment for those who are trained. Within these limitations, several country plans for the development of agricultural education and training were completed and relevant material for others collected.

During the first two biennia of the Special Program a considerable range of seminars were organized and many technical subjects covered. For the 1966-67 biennium the emphasis has been placed more upon various aspects of implementing the more important findings and recommendations of these seminars. For example, there is clearly a great need to help teachers of various technical subjects improve the effectiveness of their work. A number of workshops and training centres planned for this biennium have been specifically geared to meeting this important need, especially in the case of relatively young African teachers.

Whilst it must be admitted that it is not possible to complete a satisfactory full course of technical training in three to five weeks, experience has shown that useful practical instruction and training can be given to those already employed on certain specific duties to enable them to improve their work considerably. There are also instances where no institutional training in certain technical skills exists and where a short course may fulfill a useful purpose pending the setting up of more permanent training facilities. It is for these reasons and, in fact, to meet the wishes of member countries, that a number of short training centres have been organized in co-operation with the host government.

A further method of assisting teachers and organisers of training to widen their experience and improve the effectiveness of their work is through the award of fellowships to enable them to attend international courses of training in their subject matter fields. In 1965 a number of such fellowships were awarded to enable persons nominated by their governments to attend the Eighth International Training Course on Agricultural Technical Assistance at Borgo a Mozzano in Italy and a course in the use of visual aids at the Overseas Visual Aids Centre in London. Similar arrangements have been made in this biennium both for the French-speaking course at Borgo a Mozzano, the English and French-speaking course for Rural Youth Leaders at Herrsching in Western Germany in 1966 and the English-speaking course at Borgo a Mozzano in 1967.

The XIIIth Session of the FAO Conference not only authorized a continuation of the Special Program for Education and Training in Africa but recommended that, as soon as possible, it should be incorporated in the Regular Program of FAO and placed within the newly created Agricultural Education Branch. From the viewpoint of continuity of work and the need to draw fully upon all the technical resources of the various Divisions of FAO, this new status of the Special Program is important. It is now involved in the whole process of the development of agricultural education and training, in planning and in all aspects of the implementation of plans once they have become an accepted part of government policy.

Projects for the 1966/67 biennium lie mainly in the field of "practical implementation". They include:

(a) Special Studies - Completion, during 1966, of the studies of training needs in relation to the development of Animal Husbandry, Dairying, Fisheries and Forestry. The studies in Farmer Training are being continued throughout the biennium, since this is a relatively new and rapidly expanding field of activity in both English and French-speaking countries.

(b) Seminar and Training Centres 1966-1967

   (i) Farmer Training - At Yaoundé, Cameroon, 15-24th January 1967. Also, the holding of smaller meetings, on a national or sub-regional basis, is being planned.

   (ii) Forestry Training - Two meetings of teachers of forestry subjects at the intermediate level with a view to examine curricula, teaching methods, textbooks and teaching materials, and other aspects of effective training are now being organized (one for French-speaking and the other for English-speaking countries of Africa).

(iii) Horticultural Techniques - A training centre was held in Kenya during November/December 1966 for English-speaking countries of Africa.

(iv) Grain Storage - A training centre is being organized in Senegal in October/November 1967 for French-speaking countries of West Africa (this complements the previous training centre held for English-speaking countries in Africa).

(v) Agricultural Marketing - In response to requests, technical assistance is being given to national training centres being organized by the governments themselves in Sierra Leone, Ghana, Basutoland, Uganda, Chad, Ivory Coast, Algeria, Libya and two other African countries.

(vi) Agricultural Engineering and Farm Mechanization - a workshop of approximately 4 weeks duration is being planned for teachers of agricultural machinery and farm mechanization at the intermediate level (Uganda, September 1967). The object of this workshop, which arises directly out of the specialist report on training needs in agricultural engineering (1965), is to improve curricula, teaching methods, practical work and assessment of results. It is hoped to evolve prototype training manuals.

(vii) Workshop on Statistical Techniques in Research and Field Experimental Work was held at the Wad Medani Research Station, Sudan Republic, November 1 - December 5, 1966.

(viii) Women's Education and Training in Agriculture and Home Economics - following the previous seminars on training for Rural Women, it is now proposed to hold workshops on a national or sub-regional basis to examine training needs, curricula, staffing and staff training etc. to strengthen technical training for women in relation to the specific needs of the different countries concerned. Regional seminars are being organized during 1967 in Uganda (English-speaking countries) and Senegal (French-speaking countries).

(c) Fellowships - The policy of providing a limited number of fellowships to enable carefully selected persons, who are directly concerned with the development of training or engaged in teaching, to attend international courses is being continued.

(d) Textbooks and Teaching Materials - There is a tremendous dearth of relevant and practical textbooks and teaching materials for all levels of instruction, in most African countries. FAO works closely with a number of organizations actively concerned in the preparation of such literature for use in African countries. Under the FAO/WHO/UNICEF textbooks and manuals project, 18 texts have been produced by mid 1967 and 8 are in the final stages of development for use in English and French-speaking training institutions in Africa. The encouragement of the production of textbooks and teaching materials is being continued in close contact with publishing firms and other bodies interested in the production of teaching materials for use in African countries. Support by the Special Program has already been given to one organization producing teaching materials for use, at the elementary and intermediate levels, in French-speaking West Africa.

The preceding paragraphs and pages have described the Special Program for Education and Training in Africa, which is the most important activity of FAO in this field. However, it would be quite wrong to think that this is the only program by FAO in support of education in Africa. A very considerable program of work is being undertaken by FAO through the medium of projects under UNDP, FFHC, WFP, the co-operative programs with banks and industries, and with UNICEF assistance. Through these sources of external aid, training institutions at all levels and in various subject matter fields are being established and initial support in staffing, equipment, and the training of local counterpart staff is being organized. A number of such institutions or departments within universities serve the training needs of several countries of a region. Fellowship courses are arranged for the further training of local people who will assume full teaching and administrative responsibilities in due course. Libraries and teaching facilities are being improved and technical help regularly given. The activities of FAO amount to a very substantial effort to improve and expand training facilities in the fields of food and agriculture to meet the urgent development needs of African countries.

AGRICULTURAL EDUCATION INSTITUTIONS IN AFRICA

TRAINING OF TEACHING STAFF

By

P.C. Tissot

Specialist in Agricultural Education

In developed countries, there is a tendency to give preference to technical agricultural education and training which is as close as possible to the general system of education in its structure and which, on occasion, admits of transfer from one form of education to another, in its programs and methods (equivalent training) and in its results (equivalence of titles). The example of French lycées and agricultural colleges confirms this situation.

Generally speaking, this is not true of developing countries. For the present, education must turn out technicians of all levels urgently needed by the agricultural sector, but it must be conceived in a flexible manner so that in future it may become part of the whole educational system. One could have envisaged training these technicians by harnessing general education structures, using existing institutions and creating agricultural sections parallel to the classical traditional sections. This has proved impossible because of the slowness of studies (especially when they are not conducted in the mother tongue) to a lack of agricultural experiment or demonstration centres at urban institutions, and also to the shortage of agricultural teachers.

The setting-up of many schools which are not justified, and, above all, of schools which are too specialized, should be discouraged, thereby avoiding the resulting waste and numerous drawbacks. A common basis to all degrees for agriculturists, stock-breeders, foresters and specialists in 'génie-rural' or veterinary medicine is desirable because it creates close personal relationships between the agents of the various services, and is justified by the global approach necessary to rural development.

Whatever the duration of technical training and specialization may be, the essential need is to turn out the field technicians all countries require. This implies a considerable practical knowledge on the part of both students and teachers.

In all the French-speaking countries of Africa, agricultural education is on three levels, parallel to those of general education.

- a primary level, after the certificate of primary studies (complete primary studies) for work as monitors or technical agents;
- a secondary level, after the certificate of first-cycle studies (Brevet d'Etudes du Premier Cycle - four years of secondary studies) giving access to employment as leader (conducteur) or technical assistant;
- a higher level, after the baccalauréat (complete secondary studies) leading to employment as works engineer (ingénieur des travaux) which is a short training or "ingénieur de conception" which involves a long training.

But what will be the criteria for selecting and training the teaching staff of these institutions?

A student trained at one level may become a teacher or instructor at the level immediately below his own. Thus, men with university diplomas will be able to teach students at the secondary level; men with secondary-school diplomas will provide the teaching staff at the primary level. From a technical point of view, there will be only little difficulty because their theoretical knowledge is fully sufficient for the training they have to impart. But in the training of teachers, attention must also be directed to the practical side and to pedagogical methods.

Too many new teachers are appointed to institutions without regard to their professional training. This often happens because their services are urgently needed. The result is that they must train themselves on the job and they tend to lay too much stress on book knowledge. It is obviously easier to lecture ex cathedra by serving up the contents of school books or lessons already digested than to link the course to practical work on the land. But this is not agricultural education in the proper sense of the term, which must essentially keep contact with actual practice.

Teachers must, therefore, receive practical training before they start teaching, if only in a course of instruction at the institution where they have received their diploma. During this course they have to assume responsibility and carry out a certain number of agricultural operations. They are made to appreciate the relationship between this practical work and the theoretical lessons they will have to give to their pupils.

Once this obstacle is overcome, there remain the problems of the methods of transmitting knowledge - in a phrase, the need for pedagogical training. It may not be practicable to set up a pedagogical institute in every country or teachers' training school to provide future teachers with pedagogical techniques. But a training course of this kind either at a College (or Faculty) of Agronomy, or at a secondary school, could quite easily be envisaged and should receive strong support. The problem of suitable premises does not then arise. There remains the question of teaching staff. It is probable that this personnel would have to be trained abroad in the first instance. Their task is to acquaint teachers in training with the methods of imparting effective and well conceived lessons and how to draw up model lessons which, with steady improvements, will make it possible to achieve a perfected and balanced type of education over the course of the years.

Future teachers must be acquainted with all the methods of teaching, ranging from the classical traditional to the most modern ones involving audio-visual aids. They must be encouraged to use active methods, which, although they need more effort, are certainly more effective.

Pedagogical training does not simply consist in attendance at lessons during which the teacher describes the methods to be used. The students themselves must participate. The best system lies in asking one of the students to expound a problem to his colleagues, after a period of preparation which may vary from two hours to a whole day, depending on the complexity of the subject matter. After the lesson is over, the group offers criticisms and suggestions with the guidance of the teacher who always remains in full charge of the proceedings. He draws attention to the mistakes made by the student teacher as well as members of the class, gives his approval to the points treated correctly and makes other constructive observations. Finally, on the basis of the whole discussion, a model lesson is drawn up, outlining the course as it should be taught. Thus, every student learns to speak in public, to organize his technical knowledge, and to present it in a logical way. At the same time, he will note the common mistakes that are made, faults of elocution, and illogical points in presentation. This is of basic importance for the students' future career. It is not only necessary to accumulate knowledge but also to know the best methods for transmitting this knowledge - not superficially but thoroughly. One must explain the whys and wherefores, develop the students' reasoning, and not confine studies to the lecture summaries which they learn by heart but which will not enable them to solve problems in the field. They will certainly come up against such problems and they cannot solve them by the simple application of their theoretical courses. It is essential to develop not only the student's memory but also his practical abilities.

Thus, it is indispensable to plan and perfect the agricultural education required for the training of the various technical 'cadres' of any particular country and to give special attention to the training of teachers. In face of other urgent needs this task has been neglected somewhat. While it was natural to tackle some training of large numbers in the first place we must now consider the question of quality. On the quality of the teachers depends the calibre of the students and it is they who will be responsible for training the rural populations which are the basis of Africa's general development.

DEEP SEA FISHING TRAINING CENTRE, PUSAN, KOREA

By

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At the end of July 1966, a trim white 300-ton fishing vessel pulled into a dock at Pago-Pago, Samoa, and began to unload over 100 tons of frozen tuna and marlin. Proceeds from the sale of the catch amounted to $34,000, leaving $17,000 for the vessel's owners after payment of operating costs for the 118 day cruise.

This was no ordinary fishing vessel, for although she flew the Korean flag, she carried the insignia of the United Nations on the funnel. Moreover, besides the regular crew of 13 Koreans, she carried 45 young Korean trainees in trim uniforms, and a Japanese expert master fisherman instructor.

After returning to Korea and receiving four months further training, the 45 trainees wrote their final exams and were immediately employed in the Korean fishing industry as skippers and engineers of a variety of fishing vessels ranging up to the 300-ton size of the "Chindalle", on which they had learned to fish for tuna.

Every four months the Deep Sea Fishing Training Centre in Pusan turns out 45 - 50 graduates to meet the needs of the rapidly expanding Korean fishing industry. The training centre is a United Nations Development Program Project, executed by FAO with the cooperation of the Korean Government. Although the project was originally conceived in 1961, the first trainees did not graduate until June 1966. The intervening years were profitably devoted to the careful planning that has contributed to the outstanding success the project now enjoys.

Background of the Project

In 1961 the Government of Korea requested United Nations assistance in training fishery technicians. A small mission of three experts visited the country to determine precisely the needs of the industry. The mission consisted of Dr. H. Kasahara (United Nations Special Fund), Mr. G. Drew (University of British Columbia, Canada) and Mr. M. Girard (FAO). The report recommended proceeding with a training project and this was approved by the Governing Council of the Special Fund in 1964. A Plan of Operation was signed in November of the same year by the Government of Korea, the Special Fund and FAO and the establishment of the Deep Sea Training Centre at Pusan was declared operational on 1 December 1964.

The Training Program

The purpose of the project is to train deck and engine-room officers to act as masters and engineers on fishing vessels engaged in tuna fishing and various types of trawl fishing. While emphasis is on practical sea-training, the training cruises are preceded by a shore-course in a well equipped training school. The total training period is one year.

At present the trainees start in batches of 50 or more at four month intervals. Average age at entrance is about 24 years and education level ranges from high school to junior college graduation. They first receive about four months of shore instruction, then after a short rest of a few days they go to sea for a period of up to four months aboard the tuna longliner. On return, after a short rest, they spend about three months aboard the stern trawler. The final month is spent in recapitulation and examinations prior to graduation. During the initial shore-training period the trainees are tested at sea to eliminate any who fail to overcome a tendency towards sea-sickness. About 10 percent drop out during this period. At the present rate of three batches of trainees per year the centre is achieving an output of 150 graduates per year.

At the start the trainees are divided between the engine-room course and the deck officers course, with a little more than half taking the latter. The shore training takes place in four new modern buildings. The main building has three classrooms and offices for staff, while the other three buildings contain the workshop, dormitory for trainees, and storeroom. The workshop contains a machine shop, an engine room, and seamanship room. The latter two rooms are set up to duplicate shipboard facilities, so the trainees are fully familiar with ships' engines and navigating gear before going to sea. Recently a simulator tank has been constructed outdoors to enable the students to practice operating a depth sounder during their shore training period.

The shore training period is short but extremely intensive. Trainees for masterfishermen receive 30 hours of lectures and 14 hours of practical training per week. Most of the lectures involve instruction in navigation, seamanship, construction of fishing gear and fishing methods. Other lectures include biology, oceanography, meteorology, law, and other subjects of general interest to fishermen. The engineers' course includes lectures in basic subjects such as mathematics, physics and mechanics, electricity, diesel engines, etc., and practical training in engine operation and maintenance, workshop practice, care and operation of refrigeration equipment etc. Both the deck and engine room trainees share lectures of general interest, and a vigorous period of physical education combined with first-aid and hygiene is a daily requirement for all trainees.

During the sea training period the trainees form the fishing crew, and each member rotates through every position, function and duty on board. Short seminar-type discussions are held periodically to evaluate progress. The tuna fishing voyages have been highly successful to date. The trainees have learned to fish under commercial conditions, and the catches, which have been landed in Samoa under an arrangement with the Starkist Company, have paid all the operating costs of the vessel as well as returning a small profit to the government.

The first group of trainees graduated in June 1966, and successive groups have been graduating at four month intervals since then.

The project is scheduled to last until the end of 1969. The Special Fund allocation was $1,068,600, consisting of $1,013,500 Special Fund contribution and $55,100 Government contribution towards local operating costs. The Government contribution in kind consisting mainly of buildings and staff, was valued at $607,685. Subsequent amendments and adjustments have brought the Special Fund allocation to $1,179,400 and the Government contribution in kind to $959,454, for a total project cost of $2,138,854. A further increase in the size of the project is presently under negotiation.

The International staff of the project at present consists of a Project Manager (Training Director), an Assistant to the Project Manager (Instructor), and two Masterfishermen, one experienced in trawl fishing and one in tuna long lining. The Government professional staff consists of a Project Co-Manager and seven Instructors, one in each of the fields of Navigation, Engines, Electronics, Fishing Gear, Fishing Methods, Oceanography/Biology and Fish Processing. Government supporting staff consists of two Mechanics-Technicians, two Gear Construction Technicians, an Administrative Officer and 25 other staff associated with the operation of the school itself. In addition there are 19 sea going personnel who form the crews of the project's two training vessels.

The two training vessels were supplied to the project from a Special Fund contribution at a cost of $500,000. They were designed by the FAO naval architect team and built in Japanese yards. The largest is the 300-ton tuna longliner with a length of 39 meters, designed to operate for several months at sea in distant waters with accommodation for 50 trainees. The second vessel is a 150-ton stern trawler, intended to operate for shorter distances off the Korean coast with the same number of trainees.

Contribution to Korea's National Development Plan

At the end of the war in 1945 the Korean fishing fleet consisted mainly of a large number of small unpowered boats. Efforts to expand and mechanize the fleet received a setback several years later during the Korean hostilities. By 1961, the fleet consisted of 367 boats of over 50 gross tons and about 42,000 smaller boats of which over 85 percent were unpowered. The total number of fishermen was estimated to be 817,000.

At this time the Government initiated a five-year fisheries development plan under its overall five-year economic development plan, covering the period from 1962 - 1966. The plan called for heavy capital investment in the fishing industry from both Government and private sources, mainly directed to new vessel construction.

It was hoped to increase the annual production of fish from a total of 350,000 tons in 1961 to 590,000 tons by 1966. This goal was felt at the time to be unrealistic, but it is of interest to note that total landings in 1965 amounted to 562,000 tons and there is every reason to believe the target will have been met when 1966 statistics are compiled. Increased landings have resulted from an increase in the number of vessels over 50 gross tons from 367 to 529 and by mechanizing more of the smaller boats.

Part of the reason for this success is the unexpectedly large inflow of foreign capital for investment in the industry. This inflow is continuing, and the new five-year fisheries development plan for the period 1967 - 1971 calls for doubling annual production by the end of the period. Once again the increased production will depend heavily on investment in new fishing vessels, and availability of the skilled crews to man these vessels will continue to be a key to the success of the plan.

The Deep Sea Fishing Training Centre at Pusan has made a substantial contribution to the situation already, and will make an even more important one in the future. All graduates of the Centre to date have been employed in the industry and they have a reputation for high technical skill. Trainees are now booked for jobs several months before they graduate. While the output of trainees has been increased steadily, it still falls short of the demand, however, and plans are actively under way for a substantial increase in capacity of the project by the addition of new shore facilities and provision of an additional training vessel. This will be made possible mainly by an increase in the Government contribution to the project to cover these needed facilities. Only a small increase will be required on the part of the Special Fund, primarily to cover the services of one additional foreign expert.

Cooperation the Key to Success

The success of the project has been due to excellent support by the Government, the hard work and enthusiasm of both counterpart and international personnel, and good cooperation between the UNDP and FAO. From the time the Project Manager arrived in the country in July 1964, there has been evidence of this all-round cooperation. At his suggestion the Government provided completely new facilities for the Centre. The buildings were ready on 15 June 1965 and during the construction period the Project Manager held regular training sessions with the instructors and a detailed curriculum was developed. Work was also done on preparation of charts, demonstration gear, models and other teaching material.

On 1 July 1965, 46 students were welcomed to the first class. The FAO naval architect team, in collaboration with the Project Manager, had already designed and arranged for construction of the tuna longliner "Chindalle" and the stern trawler "Kaenali". The "Chindalle" was completed and delivered to the project late in August, well in advance of the date she was required to be made available to conduct the first group of trainees to the South Pacific fishing grounds. She sailed with the first trainees on 30 October and has made regular cruises since that time. The stern trawler "Kaenali" was delivered to the Project late in December 1965, and has also made regular training trips since then.

The rapid expansion of the Korean fishing fleet has created such a demand for graduates of the Training Centre that the Government has been continually pressing for expansion of the project. As a result, an Amendment to the Plan of Operation was signed on 28 March 1967, which provided for an increased contribution on the part of both the UNDP and the Government to improve and expand training facilities. Further, in February 1967, a Special Fund mission visited the country partly to evaluate a request for even further expansion of the Centre. The report was favourable, but some details such as the supply of a vessel by the Government remain to be worked out before another Amendment to the Plan of Operation can be prepared.

Future Plans

As the project has been in operation for less than half of its projected five-year term, plans for specialized training by means of fellowships abroad for the national staff, to enable them to carry on the Training Centre after withdrawal of Special Fund support, have not yet been advanced to any extent. Such plans are being made, however, and will be implemented well before the end of the project.

Furthermore, the Government of Korea has now asked for Special Fund assistance in the establishment of a Coastal Fishing Training Centre, for the purpose of retraining the thousands of existing fishermen who operate with small boats near the coast. It is felt that this retraining is necessary to make the coastal fleet more efficient and increase the standard of living of the participants.

The Special Fund mission to Korea of February 1967 referred to above was primarily concerned with examining this request. Their report fully supported the request, noting that it would complement the efforts of the Deep Sea Project which is training technicians only for distant water fishing. If the Coastal Training Project goes ahead, which seems quite likely, it would also be centred at Pusan and attached to the Deep Sea Centre. While the same Project Manager would be in charge of both Centres, the activities of the two would be kept quite separate. In this way, however, there would be assurance of supervision of the Deep Sea Centre for several years after the normal cut off date of Special Fund assistance in 1969, as the new project would have a life of four years starting in 1968.

The accelerating pace of investment in the Korean fishing industry (estimated to amount to $176,000,000 over the next few years) raises the risk of over-development in some sectors and inadequate provision for others. Provision was also recommended, therefore, by the Special Fund mission of a team of expert advisers to visit the country for at least five months and assist the Government in developing realistic expansion plans for the fishing industry over the next few years. They would study all aspects of the industry including fishing operations, fishing vessels, harbours and supporting shore facilities, distribution and marketing, including foreign markets.

It is believed that their work, together with the proposed Coastal Training Centre, and the continued operation of the already highly successful Deep Sea Fishing Training Centre, will provide for continued sound expansion of the Korean fishing industry.

CORRESPONDENCE COURSES IN AGRICULTURE

By

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Secrétaire-Général INADES

Director, Agri-Service-Afrique

Since October 1965 correspondence courses in agriculture have been available to all French-speaking countries of Africa and to Madagascar. The activity has been organized by AGRI-SERVICE-AFRIQUE, the agricultural arm of the INSTITUT AFRICAIN POUR LE DEVELOPPEMENT ECONOMIQUE ET SOCIAL (African Economic and Social Development Institute - INADES) in Abidjan, Ivory Coast.

These courses have had an undoubted success. In 1966, for example, the number on the mailing list trebled. More significant still, the proportion (80 percent) of students or groups of students who regularly turn in their written work and get down to serious study is very high for this type of operation.

What briefly are the sources of this success? What are the needs for which this particular kind of instruction caters? And what are the methods adopted to ensure a practical adaptation to the needs, as they apply to rural life?

NEEDS AND HOW THEY WERE ASCERTAINED

Between January and September 1964, Father Souillac, formerly principal of the Ecole Supérieure d'Agriculture at PURPAN - TOULOUSE (FRANCE) surveyed the agricultural sectors of the French-speaking countries of Africa with a view to developing agricultural training which would reach not only a few privileged individuals but the rural population as a whole. As a result, several needs emerged - needs that the conventional type of teaching has up to the present met only in an incomplete and inadequate manner.

Thus, in a great many places there are young farmer groups which, under the auspices of both governmental and non-governmental organizations [Civics service, Centre International de Développement Rural (International Rural Development Centre), Jeunes Pionniers (Young Pioneers) and Catholic or Protestant rural youth groups] try to learn how to produce more and to sell more in order to earn a better living and make a more effective contribution to the agricultural development of their countries. Groups of this kind make up a sizeable total. Formally organized agricultural training courses in various countries cannot reach out to more than a handful of privileged individuals. These groups need a form of training that can be made use of in their own villages, in their places of work and in their homes.

Contrary to what is sometimes heard, in practically every country there is a basic core of rural leaders - the thousands of supervisors, extension workers, 'encadreurs', 'animateurs', 'moniteurs', or whatever they may be called locally. Yet these people receive little support. They have few facilities at their command, and little access to the methods of training or information. People say that they do not achieve much, but little is done to improve their working and living conditions so that they may be more influential. But many of these leaders and extension workers are anxious to have training and access to information to help them to break out of their isolation and make them more competent at their tasks. They need some form of vocational training.

Again, everybody in both privately-run and state teaching is giving thought to the enormous problem of adapting to the agricultural environment a form of primary education which is inadequate at present, and is in danger of turning out many for whom there is no paid employment in the future. The schoolteachers and their assistants - most of whom have received nothing in the way of training in agriculture - accordingly, need some teaching materials enabling them to become informed of the problems of rural life, and to adapt it to the training they are giving to the younger generation, most of whom are destined to work on the land.

Finally, there is the problem of promoting functional literacy. Clearly, literacy teaching, if it is based on life as it is actually lived by the population and radiates from their central interests, is likely to produce more rapid results, because it commands more attention and achieves much more than an abstract educational course. The African farmer needs an instrument of literacy based on the fact that he is a farmer.

To summarize, training materials are needed to develop both vocational training and basic education - something adapted both to farmer groups and to the lower-level village leaders and to schoolteachers working with the African rural population at large. Such materials should be simple in expression, be well designed from a pedagogic standpoint, be effective at a technical level and suitable for serving very wide areas. That is why the AGRI-SERVICE-AFRIQUE correspondence courses were started.

METHOD

Training is given in two stages. For two years (Cours d'Apprentissage agricole), the individuals or groups receiving the course are introduced to basic techniques, enabling them to improve their methods of crop cultivation and thereby increasing their production. As they improve the way of carrying out their farming tasks, the students also improve their own basic education. Above all they learn to reflect; they discover the whys and the wherefores of the methods they are expected to put into practice. They are not only taught how they must work but also why they must work in this particular way.

Then, for two further years (Cours de Perfectionnement agricole) the students are introduced to economic problems - farm management and bookkeeping, credits and co-operatives, marketing of farm produce and agricultural economics.

Step by step, the farmers or groups of farmers, without any previous theoretical knowledge, are led up to an overall grasp of their calling, both in relation to methods of working and their technical and economic background.

The procedures adopted are as follows: for nine months out of every twelve, students receive a booklet which is very carefully presented from the pedagogic point of view - in terms of style, illustrations and layout. The language used is a sort of "basic French", which has the further advantage of being easy to translate into the local language.

The students work through their booklet following a clearly indicated method. This is especially true of groups. The member who understands French translates the text into the local language for the benefit of his fellows. Groups may be made up of youths or men coming from several villages around, so great is the thirst for knowledge in the agricultural sector.

Once their study is completed, the students reply in writing - either in their own name or on behalf of their group - to a questionnaire enclosed as a loose sheet in the booklet. The reply is sent to AGRI-SERVICE-AFRIQUE. A team of qualified agriculturists correct and comment on the answers, which are returned very quickly to the students. Students achieving an overall average of ten for replies to the questionnaires for two years obtain the diploma for farm apprentice, and at the end of the next two years the diploma of further studies in farming.

The diplomas are not officially recognized. They do not give the holder a means of leaving the countryside to go and work in an office in town, but nevertheless they do constitute a definite qualification and help local leaders to get ahead in their profession.

RESULTS

From 1965/66 to 1966/67 the numbers requesting courses trebled from 600 to 1,800. Taking into account the study done in groups (5-20 members), there are about 5,000 - 6,000 farmers (or local leaders or schoolteachers) currently receiving the courses. This justifies use of the expression: "instruction for the masses". The numbers will continue to grow in the coming year.

A high proportion, some 75 percent, of those who took the courses in 1965 renewed for 1966, which is ample proof that they were keen on their work.

For 1966/67, about 80 percent are doing regular study. This is unusually high for correspondence courses. It should be added that this assiduity is helped by the fact that AGRI-SERVICE-AFRIQUE does not confine itself to despatching booklets and correcting questionnaires; personal correspondence is frequent and the director and ASA staff spend some of their time in the field visiting groups and individuals in the different countries. In this way a personal touch is achieved, so important in view of the strong tradition of human relations in Africa.

One final point: after a paper on the subject had been delivered at the fourth FAO Regional Conference for Africa, the delegates from the English-speaking countries showed a great interest in the work of AGRI-SERVICE-AFRIQUE. A plan is being considered for translating, printing and disseminating the courses in those English-speaking countries, and it is to be hoped that the financing and ways and means of practical implementation will be forthcoming. There is enough experience already to show that agricultural correspondence courses for African farmers do not duplicate existing training facilities but constitute a means of providing large numbers of farmers, local leaders and schoolteachers with an effective means of training and information.

NATIONAL MARKETING TRAINING CENTRES, THEIR ORGANIZATION AND FUNCTIONS

By

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Lack of trained marketing personnel and absence of training facilities constitute the major obstacle to effectively improving marketing of agricultural produce,particularly in developing countries.

All personnel directly or indirectly involved in marketing, i.e., policymakers, administrators, cooperative leaders would be much better equipped to deal with day-to-day problems if they were properly trained in marketing principles and practices. A rather typical result of this lack of appreciation of the importance of functions and costs of marketing is the widespread attitude of governments and farm leaders alike that private middlemen are by definition detrimental to the economy; the services they provide are ignored. There is no doubt that exploitation by middlemen takes place in very many instances, but the policy of increasing direct state interference in marketing or entrusting cooperatives with a monopoly position in this field has only too often led to serious difficulties,because nobody with knowledge and experience in marketing could take over from the so-called "superfluous" middlemen.

Investments in marketing facilities and allocations to government marketing services are often too low in a number of development plans prepared in developing countries. Moreover, even the small allocations to improve marketing systems very often do not give satisfactory results, due to the scarcity of properly trained personnel to plan, organize and operate them.

Adequate opportunities for training of the necessary type and scope are rarely available in developing countries. In some universities agricultural marketing is included in the curriculum,but it constitutes only a very small portion of the whole course and the subject is never treated comprehensively. Even in developed regions, with the exception of North America, training in agricultural marketing is either not available or has been established very recently.

A word should be said about the quantitative need for trained marketing personnel. Almost every country has in hand development plans which will depend for their successful execution upon the availability of trained personnel, including marketing staff. Frequently the numerical assessment of the need for this staff is overlooked or not undertaken because it is "too difficult". In preparing some UN/FAO projects in the field of agricultural marketing, projections of the demand for trained personnel have been attempted. In Turkey, for example, a very conservative estimate for personnel at the senior and supervisory level is some 530 for government services alone, excluding the needs of the private sector and the Chambers of Commerce. To this must be added the very large demand for marketing personnel at the technician and foreman levels. Similar estimates for Iran indicate immediate needs for about 680 trained staff with additional annual training requirements for 100 to 150 officials. Under the third 5-Year Plan of India, the target was to train 150 senior officers, 700 to 800 market secretaries and superintendents, 1,000 graders and assessors and over 1,000 price intelligence reporters.

Such training should of course be given at universities or other institutions and presupposes the attendance of students at longer-term courses. But, as noted above, facilities for such training are lacking and their development requires considerable time. A major bottleneck is the scarcity of national and international staff: for UN/FAO sponsored projects an additional handicap is the limitation of funds. This was one of the reasons why the Marketing Branch, Economic Analysis Division of FAO has commenced with the organization of short-term national training courses in agricultural marketing.

National training centres in agricultural marketing are principally in-service training courses for marketing staff. Frequently, the participants, whether at the field or the executive level, have had very little formal training in marketing and base their approach to problems largely upon the experience gained during their day-to-day work. This is obviously not conducive to a dynamic approach, and the lack of appreciation of inter-relationships between various marketing functions, and even between different governmental marketing services, makes for an uncoordinated approach to marketing.

The first national marketing training courses were organized in the Far Eastern Region upon the initiative taken by the former Regional Marketing Officer, Mr. F.A. Shah. In later years a considerable number of courses was held in Africa and it is now hoped to expand the activity to the Near Eastern and the Latin American regions. The major limiting factor to a greater rate of expansion has been the lack of funds available and the shortage of FAO headquarters and field staff, to take on the additional workload. Nevertheless, it has been possible to organize a total of 11 training centres at which approximately 400 marketing staff participated.

National marketing training centres are organized by national governments but receive assistance from FAO. It is important to realize that financial and administrative responsibilities rest solely with the host governments. Normally the initiative in organizing a centre comes from a local or regional FAO Marketing Adviser. With the help of a marketing authority or government department, the syllabus for the training centre is prepared, after agreement on the major aspects to be treated during the lectures and discussions, has been reached. The governments undertake to provide the necessary facilities, such as lecture rooms, secretarial assistance, transport for field trips, etc., and remains responsible for salary and local costs for all trainees. FAO provides a number of lecturers from Headquarters and the field, as well as training material in the form of publications - i.e. the Marketing Guide Series of FAO - for distribution to participants. The Organization also provides some technical films on marketing.

Experience has shown that the optimum number of participants is 30. It is extremely important that they form a reasonably homogeneous group. In a number of instances the success of training centres has been sadly limited because students with little or no knowledge of marketing were mixed with experienced or well trained marketing personnel. It was then impossible for the lecturer to keep the attention of all, offering no guidance to some and "talking over the heads" of others. On the other hand, the bringing together of officers of different government departments, private or cooperative institutions, banks, public marketing bodies, etc., has proved to be very valuable. Some of the most interesting and informative discussions (even if occasionally rather heated) can arise from the exchange of ideas prevailing in different institutions in the same country and come to light for the first time at such courses.

The training centres last between 2 and 5 weeks. It seems to be inappropriate to keep officers for more than about 3 1/2 weeks away from their work and in most countries, because of the lack of marketing personnel this is too long for officers to be away from their field posts. Where training is given to a specific body a longer course is feasible. This applied, for example, in Malaysia where the Federal Agricultural Marketing Authority was newly established in October 1965. Most of its personnel, 17 young economists, had no marketing experience and a six weeks in-service training course was organized for them in 1966 with the assistance of FAO.

In Bechuanaland, training was given to agricultural officers and the staff of the agricultural department. In that country shortage of trained personnel, is particularly severe, even at the field level. When calling together the participants there was literally nobody left in service who could have substituted for them. It was therefore only possible to keep the trainees for 2 weeks.

The most important factor limiting the full success of national marketing training centres has been the impossibility of an organized follow-up. Two to four week courses cannot substitute for lack of proper training of national staff; however, even short courses may bring new horizons and interest to progressive young staff, and induce them to make an effort for deeper training. There are many examples of this stimulating effect of the training centres. For obvious reasons it will remain impossible to organize follow-up sessions with international assistance on a regular basis. It should, however, be possible to keep alive the stimulus trainees have received. For example, in countries where FAO experts operate in the field of marketing, it should not be difficult to call small groups of the trainees together once in a while and discuss with them their own local problems in the light of what they learned at the centre. When FAO personnel is not available this follow-up will have to be the responsibility of national authorities. In any case, the seed of better knowledge is already in the ground and so it has achieved the most important aim of technical assistance programs of "helping others to help themselves".

A syllabus for a typical marketing training course is given below.

SYLLABUS OF A TRAINING COURSE IN MARKETING HELD IN MALAYSIA IN 1966

Two weeks devoted to lectures.
Eighteen days devoted to field exercises and discussion of reports.

Subjects covered

- The role of agriculture in economic development.
- Factors affecting agricultural development.
- The role of credit and the supply of requisites in agricultural development.
- Demand for agricultural products.
- Land reform and agricultural development in Malaysian Government's land policies.
- Problems of agricultural development in Malaysia.
- Technical research, vocational training and extension in agricultural development.
- Agricultural marketing and economic development.
- Agricultural marketing structure.
- Preparation of agricultural products for the market.
- Grading and quality standards of agricultural products.
- Storage and warehousing of agricultural products.
- Grain milling.
- Regulations of produce markets.
- Marketing extension, demonstration and pilot projects.
- Marketing Boards.
- The role of processing and preservation of perishables in marketing, and losses in marketing of agricultural products.
- Marketing costs and margins.
- Producer's place in the marketing system.
- Co-operative marketing.
- Farmers' Associations and their role in agricultural marketing.
- The place of rubber in the national economy.
- Some problems in marketing of smallholders' rubber.
- Marketing of grain crops.
- Operations of Government Rice Stock Pile. Implementation of Guaranteed Minimum Price.
- Marketing of cabbage in Cameron Highland.
- Marketing research, methodology and techniques.
- The role of statistics in efficient marketing.
- Methods of crop estimation.
- Forecasting of demand for agricultural products.
- Price policies.
- Problems in field surveys.
- Market intelligence.

DAIRY EDUCATION FOR DEVELOPING COUNTRIES

by

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Man needs food and water every day. Without sufficient water he cannot survive, without sufficient food he cannot work. But it is not enough just to say "without sufficient food", for it depends on the type and quality of that food.

One can scarcely pick up a paper, listen to the radio or watch television today without coming across some reference to the world problems of hunger and of malnutrition. It has been variously estimated that between 1,000 and 1,500 million men, women and children are underfed or malnourished. That such a state of affairs can exist in the second half of the twentieth century is a sad reflection on mankind's progress during the last few decades. In fact, references to this awful human problem are so often seen that the figures have lost their real impact, and complacency and even apathy reign. The ordinary man, whilst being sympathetic, is at the same time overawed and one gets such remarks as "Yes, I know, but what can I do about it?"

At the heart of this hunger problem is the lack of protein - particularly animal protein - in the national diet of many developing countries. If the 1,000 million suffering human beings were each to receive only a quarter litre of milk or milk equivalent every day, to help meet their protein deficiency, it would go a long way towards solving this problem. It would also mean a world increase of about 250,000 tons of milk per day. To provide this milk an additional 30 million good dairy cows would be required immediately and about 5,000 large milk plants to process it. If these targets were to be achieved within, say, 10 years, it would mean building, equipping and opening an average of more than one milk plant every day. Impossible? No; but difficult, because of lack of proper organization, political or religious prejudices, vested interests, ignorance and lack of adequately trained personnel.

As any new industry is created or an established industry develops there is inevitably a need for trained personnel at various levels. This is equally true of the dairy industries which are slowly being established in the developing countries. For over 10 years the Dairy Branch at FAO has been aware of this need and has had a program of dairy training and education as an essential part of its work. This program is continuing and even expanding, largely due to the support received from the Royal Government of Denmark by funds provided through the United Nations Development Program for Technical Assistance.

The teaching of dairy science and technology has long been carried out in agricultural or dairying schools, colleges and at universities in the advanced dairying countries. The syllabus, based on a fundamental knowledge of the sciences, has ranged from dairy farming to consumer preferences for milk products and has usually contained a large proportion of practical work on the farm and in the milk plant for making butter and cheese, and operating modern dairy equipment. Not all courses have covered the same ground or extended over the same number of years, because different categories of personnel have needed different aspects of dairy training and education.

These courses have of course been available to students with the necessary educational background from the developing countries but the system of training students in one region to enable them to work in another region has many problems attached to it. Moreover, the type of training given in, say, the U.S.A., Australia or the U.K. is not necessarily the training needed for a man to be engaged in the dairy industry in tropical Africa. The specialized and often very academic training necessary for entry into a sophisticated dairy industry tends to produce "experts with paper knowledge" amongst students from developing countries who are therefore unsuited to return to their native countries and start to build up their own national dairy industries. Experience over many years has shown that it is generally much better to train people under conditions similar to those in their own country, where they will have to do their future work, rather than to send them to another and strange environment for their studies.

This aspect is to some extent a social one and was considered at length during the first FAO International Meeting on Dairy Education in Paris, June 1964. "It was realized" the Report of the Meeting stated, "that many students from developing countries lose their sense of perspective during their absence abroad from their homeland." Very often they do not want to return home and, even when they do, many have lost touch with their own people and may not then appreciate sufficiently the problems to be tackled in the dairy field in their own country.

It is not economically sound or financially possible for each developing country to have its own dairy school or college, especially in the initial stages when the dairy industry in the country is only just coming into existence. Moreover, if some countries have such schools they are not necessarily open or available to trainees from neighbouring countries for various reasons. To overcome these difficulties, FAO introduced in 1960 the first of the Regional Dairy Training and Demonstration Courses at which trainees from a number of countries within a region could be trained together under conditions similar to those in their own country. Facilities provided by schools, colleges or institutes were utilized for the training and, in one case, these facilities were even in several centres in two countries. The courses have always been organized and conducted under the aegis of FAO but jointly sponsored by the host country and the Royal Government of Denmark, the latter providing the funds to FAO and the host country the facilities and some local staff.

The FAO Regional Dairy Training Scheme has a threefold objective:

a) To give basic practical training in dairying to the maximum number of persons from a region as economically as possible;

b) to ensure that those trainees, who are capable of organizing a training course in their home countries and who can take responsibility in their own dairy industries, should be given specialized training in an advanced dairy country after completing their basic regional practical training;

c) to ascertain subsequently that those who have had this regional and specialized training are using their skills which they have acquired to the best advantage of the dairy industry in their own countries, to "follow-up" those cases where it is found that the trainee has left the dairy industry and to find out why he has done so.

Such regional courses of 3-4 months duration have been held as follows:

Region	Centre(s)	No. of Courses	No. of Trainees
S.E. Asia	Bombay and Anand (India)	7	155
Latin America	Santiago and Valdivia (Chile)	7	153
Near East	Terbol Station and Beirut (Lebanon)	5	46
English-speaking Africa (south of the Sahara)	Entebbe (Uganda) and Naivasha, Mariakani and Kabete (Kenya)	3	46
	Totals	22	400

A fifth regional course - in West Africa - is at present being considered, where dairy training for candidates from French-speaking African countries would be given.

These regional dairy courses of comparatively short duration can only be considered as the first steps to raising the interest in the region for the establishment in future of more permanent dairy educational institutes, as the dairy industries in the developing countries in the region emerge. But in the meantime these courses do give the trainees a basic knowledge of dairying in the region and this serves as a background for specialization for those trainees who are able to benefit from such additional training and who will have the opportunity to use it in their own countries. The second part of the objective serves this purpose.

To date a total of 120 trainees from the regional courses have been selected for further and specialized training on fellowships in Denmark, where they have been for a period of 5-6 months. It is important, however, for the success of this second part of the objective that the fellows should return to their countries and pass on their knowledge to their countrymen.

This specialized and advanced dairy training has so far been given in Denmark where the best trainees from the regional courses have been sent. This fellowship training consists of theoretical and practical training in cheese and butter making, milk powder and canned milk production, dairy hygiene etc. according to the requirements of the fellowship holder's country or to his special aptitude or opportunities.

The third part of the objective consists essentially in checking on the efficiency of the operation of parts (a) and (b) above, and also in visiting the ex-trainees and ex-fellows to see if they are being properly used in the developing dairy industries in their own countries. These "follow-up" visits are normally undertaken by the Director and Associate Director of the regional training course at a convenient time between courses, and after some five or more regional courses have been held. These visits also serve the purpose of acquainting the staff of the regional courses with the details of the dairy industries in the region which is of immense value in preparing the syllabus for future regional dairy courses.

FAO's program of dairy education in developing countries is not limited, however, to providing regional training courses and fellowships, as mentioned above, because technical assistance is also being provided in a number of other ways and new projects are continually being considered. Experts are being provided to assist with the teaching programs in several national dairy schools, colleges and institutes, where as yet national staff is not available. For example:

a) an FAO dairy expert and associate expert are assisting at the Naivasha Dairy School, Kenya, with both the teaching program and with the rural dairy development scheme;

b) at Egerton College, Kenya, two FAO dairy experts are running the Guildford Dairy Institute and teaching dairy science and technology to the students on the two-year dairy diploma course;

c) another FAO dairy expert is advising and teaching in the Philippines at the Dairy Training and Research Institute at Laguna.

FAO is thus assisting in the dairy training of young men - and women - in various parts of the world and at different educational levels.

In a rather different category, FAO is collaborating with a number of countries which have offered to hold specialized dairy courses, group fellowships, seminars, study tours and so on, in some particular aspect such as fermented milks, sheep milk utilization, dairying in warm countries, etc. It would not be possible here to list all these activities but two instances will serve to illustrate the type of cooperation and hospitality which is so readily given.

a) Every two years the U.S.S.R. has collaborated with FAO to have a group study tour on fermented milks and milk products. In 1962 and 1964 these were centred in Minsk, in 1966 the main centre was Tallinn. These tours last about 8 weeks and are highly specialized courses for about 12 fellows;

b) A five-month course on dairy technology has been given in the U.K., centred on Reading University, which was attended by fellows from a wide range of developing countries.

But it is not enough just to train young men and women. In their turn, these people must teach other young people to become leaders in the national dairy industries and to be able and willing to accept responsibility. It is necessary, therefore, to teach people how to be good teachers and leaders. Particularly in India, with the assistance of UNICEF, a program of upgrading and expanding national dairy training schemes has been undertaken by FAO. Such a training program is organized around a series of periodical teachers' tutorial workshops, specially devised to cover weaknesses or gaps in existing dairy training procedures. Those attending such workshops have come from the staffs of existing dairy institutes, and the program has been oriented towards practical training in modern processing techniques, marketing and distribution. Workshops have also been held at which national and international personnel worked on the production of up-to-date instruction manuals for use in dairy teaching establishments, especially those conducting two-year courses such as the Indian Dairy Diploma.

In the end, education comes down to a matter of communications. A common language is normally the best means of man's communication with his fellow men, either by talking to them, by writing or by reading. So far, the Dairy Training

Programs which FAO has undertaken have been conducted in one of the three official languages, namely English, French or Spanish. There is, however, a need to reach those people in the developing countries who may not necessarily understand one of these three international languages. In some countries, local or national languages are used on an extensive scale and if any progress is to be made in training the cattle owner, the extension worker, the small milk collecting centre manager, the local dairy cooperative executive and similar people, it is necessary to bring dairy training to these people in the medium which they understand, i.e. their native language. A new approach must therefore be made in FAO to this matter of communicating technical information to the people in the field.

A start in this new sphere is being made in the Near East Region where it is intended to hold National or Local Dairy Training Courses in Arabic, Farsi and Turkish. At the same time instruction will be given in English, so that the trainees who succeed in their National Course will have an opportunity of being selected to attend the FAO Regional Dairy Training and Demonstration Course for the Near East in Lebanon, where all instruction is being given in English. But for those trainees who are not selected, they will still have gained some valuable information in their own language and thus be the better enabled to help develop the dairy industry in their own countries.

It is also hoped that these National Dairy Training Courses, which will be run jointly by FAO, the Royal Government of Denmark and the host country, will enable the latter to establish in due course its own Dairy Training Centre, even if on a modest scale.

It is quite common for the developing countries to want to establish their own manufacturing industries, in order to be in the same category as the developed countries. It is, however, usually not realized by the governments in developing countries that it is only a few years ago that the developed countries were themselves agricultural communities in which the dairy industry was developing. These developed countries now have advanced and sophisticated dairy industries but, in order to achieve such industries at such a high level of development, many years of slow but sure development have been necessary.

Only by the rational growth of the national dairy industry from simple but sound beginnings can a developing country expect to have, in a reasonable time, the well organized economic dairy industry which will be comparable with those in advanced countries. To achieve this aim a proper system of dairy training, for the cattle owner at one end to the high government official at the other, is necessary and it is submitted that this can best be achieved by the program of training as outlined above, until such time as the national dairy industry has become economically viable and thereby able to support its own training institutions.

THE NEED FOR HUMAN NUTRITION STUDIES IN THE CURRICULA OF UNIVERSITIES AND COLLEGES OF AGRICULTURE

By

T.B. Morgan

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Mankind requires food for his sustenance and agriculturists are responsible for the production of this food, both animal and vegetable. The planning of food supplies and the provision of adequate diets for the people of the world has become one of the most important problems confronting mankind. Today, agriculturists are faced with the immense problem of providing enough of the right kinds of foods for the present population and, at the same time, planning for ever increasing numbers, particularly in the developing areas of the world.

This situation demands the closest liaison between nutritionists and agriculturists to establish common policies; it is essential that nutritionists are familiar with the general principles of agricultural production and that agriculturists are aware of the principles of human nutrition and food planning.

For some time university faculties and departments of nutrition have recognized the importance of including some agricultural subjects in undergraduate courses leading to bachelors degrees and many of them (eg. the Universities of London, England; Giessen, Germany; Wageningen, Netherlands; Cornell, USA) include obligatory courses in Agriculture and require students to be examined in them before they gain degrees in Human Nutrition. So far, few degrees or diploma courses in Agriculture include Human Nutrition. Why does this situation exist, why should it be changed, and how should this be done?

The curricula at universities and colleges of agriculture are already often overburdened and they have constantly to be adapted to the technical advances made in the various sciences that fall within the scope of agricultural studies. It is becoming increasingly difficult for the general agricultural syllabus adequately to cover the various subject matter areas that must be studied. An additional subject like Human Nutrition, therefore, may be resisted on the grounds that it can only be included at the expense of existing subjects. There is, however, a clear case for attempting to link these two vital components of the world food problem.

How can human nutrition studies be introduced into the curricula of agriculturists with the least possible disturbance to the already existing syllabuses? It must be stressed that the intention is not to try to convert every agricultural student into a nutritionist, but rather to ensure that agriculturists are equipped to take a constructive interest in the food and nutrition problems confronting mankind, as well as appreciating the role of agriculture in their solution.

In the general agricultural degree or diploma courses much of the necessary food and nutrition content could readily be introduced into the basic science and Animal Nutrition courses with little disturbance to existing curricula. Further, orientation could be given through the general courses in Agricultural Chemistry, by including subjects such as the nutritive values of foods for man, in addition to those for animals; and into Agricultural Economics by including food planning, the establishment of nutritional targets, and so on.

Nutrition in Specialized Courses

For agriculturists studying for specialist or honours degrees it is desirable that, in addition to a general orientation, more attention should be devoted to studies with a close relevance to human nutrition. The approach will depend upon the specialization concerned. To take one example, consider the case of a student specializing in Crop Husbandry. During the first year of study the student will have undertaken courses in the basic sciences followed by courses in various agricultural subjects during the following two years. If the necessary nutritional orientation had been introduced during these years he will have received general training in Human Nutrition. During his final years of specialization the following topics, of special relevance to the nutrition of man, could be introduced into the Crop Husbandry curriculum:

- Staple food crops and their nutritional significance
- Chemical composition and nutritive value of food crops
- Evaluation of protein quality of food crops
- Crop yields in terms of calories, protein and nutrients
- Dietary improvement through crop production
- Breeding for improved nutritive value (eg. hybridized maize varieties with enhanced lysine levels)
- The assessment of the food and nutrition situation, on area and national bases
- Food balance sheets
- Nutrition objectives and nutrition targets and the role of crop production in their attainment
- The economics of food crop production
- Food crop planning
- The place of food crops in overall socio-economic planning
- The role of food crops in meeting future food needs
- The nutritional significance of crop rotations and farming patterns
- Nutritional diseases or problems associated with different staple crops, ecological regions and farming patterns.

The inclusion of these subjects in the final phase of study of the Crop Husbandry specialist should not significantly disturb the formal study program. Only occasional special lectures need be given such as "Food Balance Sheets" and the "Establishment of Nutrition Targets and their Attainment through Crop Production".

One of the factors militating against the inclusion of human nutrition studies in courses for agriculturists is the shortage of teachers with the qualifications to enable them to teach at higher educational levels. Very few agriculturists have also been trained in Human Nutrition, and still fewer human nutritionists have obtained further training in Agriculture. This problem, though great, is not insuperable.

In considering this problem of personnel to teach in faculties and colleges of agriculture it should be remembered that many of the cornerstones of human nutritional science were laid by agricultural scientists. The pioneering work, of Boussingault, Kellner and Armsby among others, and, more recently, people like Virtanen and Maynard did much to formulate the principles of human nutrition through their work on domestic animals; and it is undoubtedly true to say that nutrition, as a science, was first recognized and developed by agriculturists. Recently, human nutrition seems to have lost its place in the training of agriculturists. It seems paradoxical that agriculturists should be familiar with the principles of plant and animal nutrition and yet know little about human nutrition, since the end-point of most of their endeavours concerns the maintenance of a good state of nutrition in man.

Orientation in Agriculture and in Nutrition

In all the developed countries of the world there are suitably qualified nutritionists who can undertake teaching duties in faculties and colleges of agriculture. Although few have received any training in agricultural sciences it would not be difficult for them to receive orientation in agriculture, so as to adapt their food and nutrition teaching to the needs of the students. Most developing countries also now possess small numbers of nutritional scientists, but not enough to provide lecturers in every faculty or college of agriculture. Thus, for example, India possesses 74 universities and colleges of agriculture, and it would be impracticable for each of these institutions to appoint nutritionists to their staffs: qualified personnel are just not available. In such circumstances the only solution is to arrange orientation courses in human nutrition for lecturers already teaching in the universities and colleges of agriculture. It is interesting to note that at the present time, FAO, with the financial assistance of UNICEF, is helping the Government of India to organize an orientation course of this type in Calcutta for twenty five lecturers from faculties and colleges of agriculture in India.

For some years FAO has also been assisting in the organization of an eight-month Nutrition Training Course at the University of La Molina, Peru, for agriculturists, many of whom are now occupied in teaching posts in agricultural institutions. This course will, in future, be organized in Bogota, Colombia, and continue to be designed specifically for agriculturists.

Agriculturists have been encouraged to attend postgraduate courses in Nutrition which FAO and UNICEF have assisted in organizing in recent years through relationships established between European and African Universities. This has helped to establish permanent training facilities in nutrition closely associated with a Faculty of Agriculture in one African country (University of Ibadan, Nigeria). In other instances, nutrition teaching has been introduced without formal links with a European University. Thus, agricultural students at the University of Makerere in Uganda now receive lectures in Nutrition as they also do at the Agricultural University of Njala, Sierra Leone, and at the College of Agriculture at Egerton, Kenya. The establishment of a Department of Biochemistry, Food Science and Nutrition in the Faculty of Agriculture at the University of Legon, Ghana, has assured the introduction of nutrition into the training of agriculturists in that country.

FAO has been closely associated with the establishment of all the facilities mentioned and will continue in its efforts to assist in the inclusion of Human Nutrition in agricultural training. Where the necessary facilities do not exist in developing countries fellowships will be awarded for training abroad, and, when necessary, the organization of ad hoc training courses and seminars. As a result, it is hoped that within the next decade each major Faculty or College of Agriculture in developing countries will possess the appropriate staff and resources to establish departments of Food and Nutrition.

Although the necessity of including Nutrition in the training of agriculturists is of the greatest importance in developing countries it is also of significance in those developed countries where food production is at present satisfactory, as well as those dependent upon imported food. Further, since the agricultural curricula of educational institutions in developed countries have in the past so often provided the basis for courses in developing countries, developed countries should point the way by including Human Nutrition in their agricultural training programs. At present, a mere handful of European schools of Agriculture do so.

Mission to European Countries

In 1961, a joint FAO/WHO Mission visited six western European Countries to report on the place of nutrition training in universities, colleges and other institutions. In the countries visited the mission considered that facilities for nutrition training were inadequate, and, generally speaking, completely lacking in university level educational programs, including those of faculties and colleges of agriculture. Since 1961, three European universities have announced the establishment of nutrition training facilities in faculties of agriculture (Oslo, Norway; Nottingham, U.K.; and Cambridge, U.K.). Though this represents progress, it is not enough, and the European Commission on Agriculture (ECA) which met in Rome in May, 1967, recommended that FAO should draw the attention of European Governments to the need for including training in food and human nutrition in the curricula of agricultural training establishments. This matter is being actively pursued by the FAO Secretariat; and following another recommendation of the ECA it will be further discussed as an item on the agenda of the forthcoming biennial FAO Conference.

It is fully appreciated that university budgeting is such that the financial and other provisions necessary for the establishment of academic posts and facilities for including Human Nutrition in the training of agriculturists cannot be established overnight. They require careful planning, and thought must be given to deciding whether it is feasible or desirable to try to establish a Department of Nutrition within a faculty or college of agriculture at the outset. It may be better, in the first instance, to include a Nutrition Section or perhaps just a lectureship in Nutrition within one of the existing departments.

Attention should be paid to the traditional or current interests of the different departments of the faculty before deciding the location of such units or lectureships. It may be that in one faculty the establishment of a teaching post in Food Economics within a Department of Agricultural Economics would be most feasible, whereas in others it may be one in Human Nutrition within a Department of Agricultural Biochemistry or, for example, Dairy Science; in other instances it may be a lectureship or unit of Nutrition Education within a department of Agricultural Extension.

As yet there are no textbooks, either in the field of Agriculture or in Human Nutrition, that give adequate consideration to the agricultural and agro-economic aspects of nutrition. The nearest approach that has been made to covering these subjects has been in "Nutrition et Alimentation Tropicales" by Autret and Ganzin. Some classical textbooks in Animal Nutrition (eg. Looslie and Maynard) consider certain aspects of human nutrition (such as calorimetry and energy expenditure) and some, in the field of Human Nutrition and Dietetics (eg. Davidson and Passmore) deal with certain specific aspects of agriculture in relation to nutrition. However, it must be recognized that at present there is no textbook that could provide the overall basic and applied knowledge in the field of Food and Nutrition, from which a student of agriculture could obtain a general orientation, let alone specific knowledge. This is a problem that must be rectified if the goals we set ourselves relating to human nutrition in the training of agriculturists, are to be realized. However, the FAO/WHO/UNICEF Textbook and Manuals project has resulted in the production of a number of publications* that help to fill this gap and various other booklets** and technical reports*** have been prepared by FAO that can make a contribution to the technical knowledge that requires to be imparted to agricultural students.

Why Nutrition for Agriculturists?

Why should human nutrition form an important component of the training of agriculturists? First, as has already been stressed, it is desirable for its own sake, because of the intricate relationship between food supplies and the nutritional status of populations dependent upon them.

Secondly, agriculturists with a knowledge of human nutrition can furnish information and prepare documentation on factors affecting human nutrition that Ministries of Health (and other Ministries) often cannot supply. Such advice may be at the planning level, or on the production, importation and distribution of foods; on embargos and tariffs that may be desirable on agricultural and nutritional grounds; on the elaboration of food policies and agricultural subsidies. It can assist in determining food regulations and food standards; in undertaking technical, educational and other measures concerning food and, in the overall sense, orientating food production to meet the food requirements of populations.

Thirdly, agriculturists with a knowledge of human nutrition are increasingly required to assist in undertaking applied nutrition programs in a whole range of agricultural contexts, from poultry raising to promoting increased production of grain legumes, throughout the developing areas of the world. As countries begin to realize the magnitude of the food and nutrition problems with which they are confronted, and the need for appropriate personnel to deal with their solution, large numbers of agriculturists are required with a knowledge of the broad principles of human nutrition.

Fourthly and lastly, Ministries of Agriculture throughout the world are coming to appreciate their crucial responsibilities in the face of their food and nutrition problems. In the past this was often assumed to be the prerogative of Ministries of Health. But while such ministries continue to have important responsibilities in defining the form and extent of nutritional deficiencies in any given situation and their treatment, the long-term solution to the problems lies in the improvement of food consumption levels for which Ministries of Food and Agriculture are almost exclusively responsible. The world is beginning to recognize the role that food production has to play in its destiny; the preliminary results of studies for the Indicative World Plan stress the vital importance of this role.

The attainment of the twin goals of improving food supplies and food consumption levels demand closer associations in the training of agriculturists and nutritionists so that a core of personnel is available and equipped to combat the greatest problem that has yet faced mankind - that of adequately feeding itself.

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* eg. "Nutrition in Relation to Agricultural Production" by I.S. Dema.

** eg. The FFHC Basic Studies Series No. 5 "Nutrition and Working Efficiency".

*** eg. FAO Nutritional Studies Series, No. 15 "Calorie Requirements".

DEVELOPMENT OF AFRICAN INSTITUTIONS OF AGRICULTURAL EDUCATION AND TRAINING IN RELATION TO URGENT PRIORITY NEEDS IN AGRICULTURAL RESEARCH

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It is now widely accepted that rapid and sustained development of the agricultural wealth of many African countries is the most important single factor in their economic and social progress. In these circumstances agricultural research and experiment, which provide the basic information essential to agricultural change and the development of new and improved techniques, must also be accorded a high priority in national development plans. In order to meet its great responsibilities adequately agricultural research in most African countries needs strengthening enormously in terms of professional staff, facilities, equipment and financial support. It could be claimed, with equal justification, that agricultural education and training (using these terms in their broadest meaning*) are quite basic to agricultural progress and have very similar needs to enable them to play their full and proper part in national development. At a time when highly trained professional staff, facilities and finance are in very short supply agricultural research and agricultural education not only compete with other important interests such as health, education and national security but, what is more serious, they may, in fact, be competing with each other.

The principal purpose of this paper is therefore to discuss the organization of agricultural education, research and advisory services and to consider practicable ways by which they could develop more effective working relationships and make the most use of scarce resources in giving good service to agricultural development. At the outset it should be emphasized that no perfect organizational blueprint of universal application exists and it is very naive to suppose that arrangements which have given satisfactory results in one country or part of the world will necessarily suit the conditions and needs of other countries. Every country - and this applies with force to many newly independent nations - wishes, and indeed has the right, to develop its own systems in the manner it considers most appropriate in meeting its national needs and priorities. Thus this paper will endeavour to confine itself to an examination of principles and their practical application under widely varied circumstances.

Historical Legacies

African countries have inherited many of the concepts and systems of education, research and agricultural administration of the metropolitan powers which originally sponsored them. More recently, they have been influenced through the acceptance of offers of bilateral aid. Thus examples of many different patterns of education and research and many different approaches to agricultural organization and development are to be seen in Africa today. It would be correct to describe this situation as transitional in which new nations are experimenting in ways and means of modifying their educational systems, their organization of agricultural research and services towards the goal of establishing systems based upon their own conditions, needs and circumstances. It is also relevant to observe that the development of general education, which provides the essential foundations for professional and technical education and training, has been introduced and developed in very different ways and at different rates in various African countries. Thus, at the present time, some African countries are relatively well off as regards skilled manpower at the professional and technical levels whilst others are still greatly dependent upon expatriates in research and teaching. Between African countries themselves there is considerable disparity in the rates of development of general and technical education and in the extent to which they are able to supply their national requirements of professional manpower. This situation lends special significance to the importance of African universities and institutions of higher technical education opening their doors to students from other African countries where specialized education and training facilities do not exist.

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* The term Agricultural Education is here taken to include technical education and training in Agriculture, Forestry, Fisheries, Animal Health and all those subjects directly connected with the development of food and agriculture.

In considering the relationships of agricultural education, research and the advisory services it is also relevant to bear in mind certain legacies of the past. In the development both of research and the agricultural services of many African countries, professional and technical staff were supplied principally from the countries of Western Europe having received their education and professional training in the schools, technical colleges and universities of European countries. Thus the main training need in former times within the African countries was to produce technical assistants to fill the middle and lower cadres of the agricultural services. This meant that very limited attention was devoted to the planning and development of agricultural education and training in order to meet national needs for trained manpower, at all levels, until after the Second World War ... Thus at a time when regional and national research institutions were well established and field advisory services were operating on a considerable scale, university faculties of agriculture in Africa were still in their infancy or had not yet been established. The following table taken from The State of Food and Agriculture 1965 illustrates this late development of university faculties of agriculture in a number of African countries.

Table I - Annual Out-Turn of University Graduates in Agriculture in Africa *

	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
	Numbers									
Algeria	-	-	-	-	-	5	6	31	35	48
Cameroon	-	-	-	-	-	-	-	5	10	13
Central Africa	-	-	-	-	-	2	-	2	3	1
Congo, Democratic Republic of	-	-	-	-	-	-	-	-	1	-
East Africa	-	-	-	-	-	-	9	12	11	13
Ethiopia	-	-	11	17	24	23	43	31	36	52
Ghana	-	3	1	9	7	13	11	12	23	6
Liberia	-	-	-	-	-	-	-	-	4	4
Morocco	-	3	6	14	16	21	16	25	22	28
Nigeria	3	4	6	9	10	11	7	20	24	22
Tunisia	-	-	-	-	-	22	27	35	54	62
Total	3	10	24	49	57	97	119	173	223	249

* Excluding South Africa. The table also excludes Libya, Sudan and the United Arab Republic, which are included in FAO's Near East region.

One result of the piece-meal development of these three major components of agricultural improvement is that they tended to grow up in relative isolation one from the other. Agricultural education, a very late-comer in the field was, for a very long time, hard put to it to obtain the support its importance deserved in terms of staff, facilities and adequate finance. In 1950 the Makerere Faculty of Agriculture (originally started in 1936) which had been set up to serve the professional training needs of Kenya, Uganda, Tanzania and Zanzibar, had one full-time teacher supported by part-time lecturing by staff on the research and experiment stations of the Uganda Department of Agriculture. It had no facilities of its own and the total number of students from the 4 countries was 7. At the same time there were very well developed regional and national research institutions and experiment stations as well as fully staffed agricultural services. Not only was it well nigh impossible to attract suitable teaching staff to serve in institutions of agricultural education but it was equally difficult to recruit promising students to agriculture which, in those days, was not a popular subject amongst preliminary science students at Makerere.

For these and other reasons agricultural education has only within the past ten years or so come into its own as a profession in Africa. Only recently has it been given the more adequate support from governments which its vital importance justifies. Only now are some faculties of agriculture beginning to engage in programs of research and are able to contemplate the development of graduate studies*. National universities have also gained greatly in maturity and esteem and are attracting to their service many of the most able persons who have had the opportunity of advanced university studies abroad. Thus a situation has now arisen in a number of countries where universities are coming into a position where they can make important contributions in research related to national development needs and it is highly appropriate that their relationships with other institutions and organizations concerned in national research be examined.

Interdependence and Relationships of Agricultural Research, Education and Extension Services

The ultimate objective, as well as the financial justification for agricultural research, education and training, and the work of the agricultural services lies in the development of national agricultural resources and the improvement of agricultural production. These aims are simple to state but complex in execution. They involve many social, economic, and political implications in addition to the technical problems they pose. The three major components of agricultural improvement, already stated, involve, in many cases, different government ministries and organizations for their administration and financial support. In a situation where it is essential that these three components work in the closest harmony in the national interest, there are forces and circumstances which tend to separate them. In what respects are they dependent upon one another and how may a situation which is at present not always satisfactory be resolved by better planning and organization in the future?

Teaching of the science and practice of agriculture, at university and intermediate levels, is directly dependent upon scientific research. Teachers, especially those at the university level, need themselves to be actively engaged in research and closely in touch with other research in their own fields of competence, if their teaching is to be up-to-date and inspiring to students. In many disciplines, but especially in the economic and social sciences, much of the essential material for teaching has to be obtained as the result of local agricultural research related to the problems of climate, soil fertility, crop and animal production and health, as well as the study of agricultural systems, the social and economic background of rural societies and their reaction to change and innovation. Much teaching today in developing countries is inevitably based upon research and textbooks developed under totally different circumstances and conditions having little, if any, relevance to the local problems of agricultural development. There is also much criticism by those who employ university graduates and technicians coming from local institutions that their training has not adequately prepared them for the kind of responsibilities and skilled technical tasks which they are required to undertake. There is, therefore, an unanswerable case for an expansion of local research in which educational institutions take a share and from which the whole inspiration of good agricultural teaching is derived.

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* Described in some countries as 'postgraduate studies'.

From the viewpoint of research services, whether national or regional, their dependence upon universities and technical training institutions is very great indeed. In the first place, it is at the university where all research workers receive their basic education, as well as their more specialized post-graduate training, which fits them to embark upon a research career. Not only may they choose a research career as the result of working under an inspiring university teacher, who is himself engaged in important research, but the post-graduate seminars and group discussions organized by university departments can be a source of great stimulus to young graduates. Many universities also organize regular scientific symposia which are attended by local research workers as well as those from other countries. Thus, in various ways, universities and university faculties and departments often become the focal meeting place for agricultural scientists, economists and others, and in this way perform an important service to agricultural research.

The connection between agricultural teachers and the work of the field advisory or extension services is also a matter of practical importance. Students in university and intermediate level institutions of agricultural education are mostly being trained for professional and technical posts in agricultural research, administration, teaching, extension, and other duties. It is therefore essential that their teachers are in close touch with what is going on in these services to agriculture. The more applied aspects of teaching need to be related to the actual problems of agriculture in the country. If young people are being trained for extension duties then they require a "laboratory" for their practical work and this can only be provided effectively through close collaboration with the local extension services. Furthermore, field staff of the extension services, often working in isolated places and with limited technical support, are in need of regular in-service training courses. These, the agricultural faculties and training institutions are best able to give, provided they have adequate staff and facilities. Again, therefore, a convincing case can be presented for the development of close working relationships between teaching institutions and national agricultural extension and other services.

Expansion of Agricultural Research and the Development of Graduate Studies in University Faculties

In many African countries faced by the urgent need to expand and intensify agricultural production there is justification for a greatly strengthened program of agricultural research. Likewise, in university faculties of agriculture, more especially those which have consolidated their undergraduate teaching and now wish to develop postgraduate studies, there is a real need to expand their research interests and activities. Unless they can do this they cannot offer essential training and experience to graduates destined for research careers. These will, as in the past, have to go to foreign countries for lengthy periods of postgraduate study in order to qualify for research appointments. Whilst this movement between local and overseas universities has many valuable features it does not always provide ideal or relevant training for a research career in a different environment and many of those who have been sent for such training have not returned to the job for which their training was intended to prepare them. In a number of African countries there is therefore an exceedingly strong case for the development of postgraduate training and research. Both the urgent need for expanded agricultural research as well as the need for development of postgraduate studies in national universities face formidable difficulties in terms of increased numbers of professional and technical staff, expanded facilities and equipment. Is it possible, through better coordination and a more rational sharing of responsibilities to achieve both these urgent needs together - expansion of agricultural research and development of graduate studies - at African universities?

National and Regional Councils for Agricultural Research

The fact that there are often several different interests and agencies involved in agricultural research in African countries would seem to suggest the desirability of setting up of national or regional councils for the purpose of coordination of effort, the allocation of priorities and possibly the financing of specific projects. University interests in agricultural research would need to be adequately represented on such councils. It is to be hoped that through the operation of a national or regional body a reasonable division of responsibilities for research projects might be achieved and in this way the university research potential might be recognized and integrated within the over-all program of research. There are certain fields of research, more particularly in the economic and social sciences, in which non-government organizations such as university faculties may be in a better position to obtain accurate data than government institutions. Universities, too, with strong faculties of science, engineering and other disciplines closely associated with faculties of agriculture may also be favourably placed to undertake responsibility for specific research projects within the context of the national agricultural research programs. The establishment of national or regional councils for agricultural research could be one practical step towards making the maximum use of available local resources in resolving the urgent problems of agricultural development.

Relationships of Agricultural Research Institutions with Faculties of Agriculture

There is a need for the development of much closer and more effective links between research institutions and university faculties of agriculture (and, indeed, between experiment stations and plant and livestock improvement centres and intermediate agricultural training institutions). Cases exist where, by government decision, all agricultural research has been made the responsibility of the university. An example of this is in Northern Nigeria where the Ahmadu Bello University at Zaria has, for several years, been in charge of the Institute of Agricultural Research and its various outlying stations. Research policy and programs are worked out in full consultation with the Ministry of Agriculture. Elsewhere, research institutions continue to be the responsibility of ministries of agriculture or the bodies under which they were developed and by which they are now financed. In nearly all cases there would be very great mutual advantages to be gained through their closer association with university faculties. In East Africa, for example, the regulations of the University permit the registration for higher degrees through research, of graduates working at research or teaching institutions, without insistence upon lengthy periods of university residence. This in itself is an encouragement to young people to develop their individual research interests, under university supervision, for recognized higher qualifications. It is also possible to place postgraduate students at these research institutions under the supervision of senior research workers to carry out their research projects and thesis preparation. In certain instances research institutions have entered into formal relationship with the university faculty associated with their field of work. For example, the Namulonge Cotton Research Station in Uganda now has a formal relationship with the Makerere Faculty of Agriculture, and the Fisheries Research Institute at Jinju (Uganda) with the Department of Zoology in the Faculty of Science at Makerere. Under these formal relationships research staff contribute short courses of lectures on their specialized subjects and are accorded academic status by the university. Likewise, postgraduate students do the practical work for their research projects at these institutes in appropriate circumstances. Such relationships not only make excellent use of available professional manpower both in teaching and research but they also give a considerable stimulus to research effort and encourage wider discussion of research topics.

It follows from what has been said that even without radical change in the present organization of agricultural teaching and research, measures can be taken which result in far better working relationships between research institutions and university faculties. In the design of facilities, both at universities and research institutes, provision should always be made for the accommodation of visiting scientists and postgraduate students, for outside lectures and meetings, and for suitable laboratory accommodation for postgraduate research students.

Graduate Studies and Research in University Faculties of Agriculture

The expansion of faculties of agriculture into postgraduate teaching and research is essential to their survival as university institutions. Without the stimulus of active research undergraduate teaching becomes monotonous and dull. Postgraduate teaching and research not only makes it possible for a faculty with limited teaching staff to expand its research effort but it also provides an excellent training ground for both future research workers and university teachers. Graduate students can also render invaluable help as part-time demonstrators in the large undergraduate laboratory classes where assistance to hard pressed university teachers is so difficult to obtain. Furthermore, they can also be used to great advantage in a wide variety of field studies involving the collection of data at regular intervals, farm management studies on peasant holdings, and other investigations often requiring the use of local dialects. There is very strong argument, in many instances, for graduate training of future research workers within the broad environment in which they will eventually work.

A strong case already exists for the development of postgraduate studies in the more advanced university faculties of agriculture in Africa. Their principal purpose would be to provide advanced training for future research workers, agricultural specialists of many kinds, teachers of agricultural subjects, and others. In addition, the development of postgraduate studies is the principal and least expensive means by which faculties of agriculture can expand their research activities. The major problem is finance, since these developments imply more staff, accommodation, facilities and equipment. This presents an important challenge not only to governments and universities but also to sources of external support. If worthwhile results are to be achieved planning, regional consultation, and a rational distribution of postgraduate studies and research are called for. It will have to be recognized and agreed that all faculties of agriculture cannot expand into postgraduate studies in all the fields they would wish and there will have to be regional specializations, at least in the earlier stages of development.

What is proposed is that strong postgraduate schools, specializing in fields appropriate to the environment in which they are situated and in relation to the support they can expect from other faculties of the university and local research institutes, should be developed at selected faculties of agriculture. These would offer courses and research facilities within their specialization to postgraduate students from other African universities and vice versa. Thus it would be anticipated that different but complementary specializations would be developed in the universities of North Africa, the West African forest belt, the highlands of East Africa, and the great forest areas of Central Africa. In some regions the development of livestock is predominant, in others arable farming and mechanization assume special importance, in yet others horticulture and perennial tree crops offer great scope for specialization. Such a concept as this would fit in well to the development of research specialization on a regional and ecological basis. The development of focal points of active postgraduate studies and research based upon selected faculties of agriculture and with graduate students coming from a number of different African countries would provide an immense stimulus to the expansion of research and the training of African research workers within their own environment working upon problems of immediate practical concern.

Conclusion and Summary

Agricultural development in African countries is in need of sustained support by a well planned program of basic and applied research. Many research organizations and institutions are facing the greatest difficulties owing to shortage of trained local staff and the frequent changes of expatriate staff. Owing to the late development of faculties of agriculture and their own staffing problems there are very few organized graduate programs where future research workers, university teachers and other high level professional staff can be trained. University faculties need themselves to engage in active research programs if they are to function properly. The major constraints to the expansion of agricultural research and graduate studies at the universities are the shortage of professional manpower, finance and facilities. The question examined is whether by better national planning and the development of agricultural education, research and advisory services as a well integrated structure these constraints can be overcome and more effective service rendered to agricultural development.

It is the belief of the author of this paper that very great improvement of the present situation is possible. An effective national council for agricultural research, with adequate representation of the university and all other major interests involved could do a great deal to evolve national agricultural research policies and to effect an equitable distribution of research responsibilities between research institutions, university faculties, and other agencies involved. A considerable strengthening of research effort would stem from the development of graduate courses and research based upon mature university faculties. This development would be the means of training many more local people for research careers. It would have a most stimulating effect upon undergraduate teaching and, indirectly, upon the teaching of agriculture at the intermediate level. The development of formal relationships between research institutions and university faculties would also confer mutual benefits and could result in better research and better teaching. Financial considerations alone make it imperative that there be some sharing in the development of graduate studies between different universities with faculties of agriculture developing specializations in accordance with their facilities, the environment in which they are situated and the support they can attract. This paper calls for study, discussion, and systematic planning to achieve an ordered development both of agricultural research and agricultural education neither of which can thrive or serve national needs in isolation.

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